CREATING PERFORMANCE INDICATORS FOR PUBLIC-PRIVATE PARTNERSHIPS IN HEALTHCARE-SAUDI ARABIA

By

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ABSTRACT

Introduction

The Saudi government and Ministry of Health are under increasing pressure to find, evaluate, select, and adopt new solutions in order to improve the quality and access to healthcare facilities. One solution the government is exploring is public private partnerships (PPPs), the premise being that the private sector has more experience in effective and efficient operations and management of healthcare services. However, when adopting such solutions, the primary focus of decision-makers is the financial and managerial aspects during negotiating the contracts and partnerships with the private sector. This dissertation has made an effort to take the perspective of healthcare experts on prioritising proposed indicators in the two main domains of quality of care and access to care; for potential inclusion in contracts between the government and the private sector to manage the services utilising the PPP models.

Study Aims

The study began with a literature review about the Saudi healthcare system and the history of PPPs and management reforms in Saudi Arabia, aimed at understanding the historical relationship between the two sectors. The second manuscript focuses on the selection of performance indicators by experts, using the Delphi technique, to determine which should be included in the contracts between the government and the private sector for managing and operating the services in secondary care hospital settings in the Saudi healthcare system. Finally, the third paper assesses the feasibility of measuring the selected indicators if they were to be included in the contracts. However, the main objective of this study is to propose a methodology to decision makers suggesting ways to consider the healthcare professionals' perspectives and inputs as part of contractual performance measurements with respect to important domains such as, quality of care and accessibility in initiatives such as PPPs.

Methods

The first manuscript's methods included a review of literature between 1980 and 2017. The sources and type of the literature were from international and national journals in addition to local libraries to review both peer-reviewed papers, thesis and grey literature. For the second manuscript, the method used to reach an agreement among the experts to select the indicators for PPP project was Delphi technique with a questionnaire of list of indicators from valid sources, whereby the experts can rank them and score them using Likert-scale for scoring of each indicator. Finally, the third

manuscript was a cross-sectional study of evaluating the feasibility to measure the recommended indicators from the second manuscript. This was achieved by sending a questionnaire with five questions to the quality directors in each hospital in the pilot. Thereafter, the discrepancy between the scores of the feasibility for each indicator was compared among the four hospitals by using Golden Standards method.

Results

The work from the first manuscript provided a general overview of the management reforms in the last three decades in the healthcare system in Saudi Arabia. Moreover, the study analysed the history of the relationship between the governmental and private sector in the healthcare industry during the same period. In the second and third manuscripts, the experts recommended 23 performance indicators including 17 Quality indicators (two for clinical care, 13 for patient safety, and two for patient-centred and coordinated care) and six Access indicators. Three of the 23 indicators were identified non-feasible to be measured and have high discrepancies among the pilot hospitals. It is proposed that these 20 recommended and feasible indicators can be included in contracts when the private sector is assuming control and offering services while utilising the PPP model.

Conclusions

In healthcare system, it is essential and significant to consider the perceptions and perspectives of healthcare professionals on monitoring and measurement of the performance, when private sector companies start operating and managing the services, historically offered by the government. Moreover, the experts appreciated the process followed in seeking their input using an evidence-based methodology such as the Delphi technique, which provides a good opportunity to achieve a general agreement among experts.

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CHAPTER ONE

1.1 Thesis Overview

Since the establishment of the country, it has been observed that the healthcare system in Saudi Arabia has been exposed to many reforms. Recently, there is a trend toward initiatives such as Public-Private Partnerships to minimise the pressure on the government and shift the overwhelming number of tasks to the private sector. However, as a healthcare professional after observing this shift, the main concerned is about the methods and type of measurements to achieve a successful partnership between the government and private sectors. In order to address that concern, this dissertation is carried out to propose a methodology. The methodology aims to engaging healthcare professionals in measuring the performance of the private sector when they are expected to take the lead in offering and managing the services that once were managed by the government.

As part of the dissertation, the focus is on generating three manuscripts. The study begins with a literature review about the Saudi healthcare system and the history of public private partnerships (PPPs) and management reforms in Saudi Arabia to understand the historical relationship between the two sectors. The second manuscript focuses on the selection of performance indicators by experts, using the Delphi technique. The selection of indicators determines which should be included in the contracts between the government and the private sector for managing and operating the services in secondary care hospital settings in the Saudi healthcare system. Finally, the third paper assesses the feasibility of measuring the selected indicators if they were to be included in the contracts.

Here onwards, in this chapter, each of the manuscripts will be summarising. Separate chapters are dedicated to each of the manuscripts. Finally, the last chapter synthesises the work

performed so far with practice implications and recommendations for future work in the context of quality and access to care and accessibility in initiatives such as PPPs.

1.2 Manuscript One: Literature Review: Understand the history of the healthcare system and the relationship between the government and private sectors.

Although a long history of welfare-based ideology around the provision of healthcare services, in present-day Saudi Arabia continues to move toward a commercial orientation of care provision (50); as a result, the private sector is becoming a challenging player in the landscape of Saudi Arabia. This change cannot be isolated from the demands on the healthcare delivery system, such as resource limitations, the changing epidemiological profile of the population, professional health shortages, and poor deployment of information technology to fulfil current needs (21).

The significant involvement of the private sector is a relatively new development. There is much room to understand its impact on healthcare in Saudi Arabia along with the best practices for involving the private sector in healthcare, and the unique strengths, limitations, barriers, and opportunities in the governance of healthcare within the country. The goal of this manuscript was to closely examine the private sector as a key player in the healthcare governance landscape of Saudi Arabia. Through an analysis of peer-reviewed literature, the types and history of health-sector management reforms in Saudi Arabia are easy to comprehend. Additionally, the research aimed to better understand the impact of private-sector partnerships and privatisation on the dimensions of quality of and access to healthcare in Saudi Arabia. The manuscript's findings are expected to serve as an easy-to-use, informative resource for Saudi Arabian policymakers, civil society, and healthcare practitioners as they govern healthcare

regulations and incentives in the country. However, more scientific research needs to be done to understand the history of the healthcare system and the involvement of the private sectors as well as the impacts of its involvement in the context of the provision of high-quality medical care with easy access.

1.3 Manuscript Two: Selecting Performance Indicators for PPP Projects in Healthcare in Saudi Arabia

In the healthcare sector, the decision-makers and leaders in Saudi Arabia are adopting reforms related to public-private partnerships as a solution to healthcare systems. This is due to the problems linked with the quality of care, accessibility, equity, and efficiency and cost control. However, there are no clearly identified and selected performance indicators for PPP reforms to measure if the reforms can meet expectations and lead to positive progress and improvement toward well-defined goals.

This research aimed to identify and select performance indicators for PPP projects in the Saudi healthcare system. This involved using the Delphi technique with a quantitative questionnaire. The questionnaire includes a list of recognised and valid sources of healthcare performance indicators for secondary care hospitals, as a guide to conduct the interviews with the experts. In this paper, the focus was primarily on generic performance indicators for secondary care hospitals in the following two main domains: effectiveness/quality and equity/accessibility. These domains are in the context of the three main aspects and types of indicators: structure, process, and outcomes. The indicators are derived from the Donabedian model, which is a widely accepted conceptual framework used to examine and evaluate the quality of healthcare services (7,8). The performance indicators were selected from

internationally recognised professional organisations, including the Saudi Central Board for Accreditation of healthcare institutions- CBAHI (www.cbahi.org), Agency for Healthcare Research and Quality-AHRQ (www.ahrq.gov), Joint Commission International -JCI (www.jointcommissioninternational.org/), and Organisation for Economic Cooperation and Development-OECD.

1.4 Manuscript Three: Feasibility of the Selected Indicators

Selecting the index of performance indicators by using a valid method such as the Delphi technique might not be sufficient to use the performance indicators effectively. However, even if the indicators are selected by experts in the field, the need to understand and measure the feasibility of using these indicators must be studied to ensure that the indicators are usable. The aim was to test the performance indicators selected by the experts in the second manuscript by evaluating the feasibility of the selected indicators, including the availability of valid and consistent sources of data to measure and apply the indicators.

The evaluation was conducted as a pilot study. The retrospective, the cross-sectional study applied the selected indicators from the second manuscript to evaluate the feasibility of using them to measure the performance of the secondary care hospitals. The feasibility in this setting was defined as the availability of reliable, valid, and consistent sources of data across the secondary care hospitals. The measurement was evaluated by a survey that was distributed to the quality director in four major secondary care hospitals in Dammam, Jazan, Mecca, and Arar. The survey had a Yes or No answer for each of the following indicators:

- Acceptability means: The level of acceptability of indicator X and who will be undertaking the assessment are determined (5).

- Data availability means: The data sources to be collected to measure the indicator are available, valid, and consistent (5).
- Reliability means: The errors are at their most minimal level when measured, and the findings are consistent so that, if repeated, they would give the same results (5).
- Sensitivity means: The indicator X captures the change in the component that was measured and reflected that in the result. Where the indicator should detect changes in the measurement process is reflected in the outputs and results (5).
- Specificity means: Indicator X is able to capture changes that happened only in the particular service that was intended to be measured and reflects that in the result (5).

1.5 Implications for Practice and Policy

1.5.1. Practice

The study can potentially impact multiple levels related to the model adoption for engaging the private sector in healthcare service delivery in Saudi Arabia. The foremost level of the potential impact from a practice perspective is that the monitoring of the performance of the private sector should have quality and accessibility indicators in the contracts and should also consider practitioners' perspective. Practitioners are critical stakeholders that help to ensure that agreements between the public and private sphere go beyond focusing on the financial and legal aspects.

Secondly, the study proposes a valid methodology that should be used to have agreement among the experts and assist in selecting the indicators for monitoring performance at the contractual level when the government forms more partnerships with the private sector.

1.5.2. Policy

Privatisation and PPP models are increasingly being adopted to overcome challenges in the healthcare delivery system in Saudi Arabia. As this trend continues, a policy is needed to promote contractual agreements that include quality of care and accessibility indicators selected by experts using a valid methodology. The perspective of practitioners will not only improve the sustainability of such projects while minimising potential corruption but also increase their likelihood of continued success.

1.6 Conclusions

Including a list of indicators in contracts with the private sector is a critical perspective to be considered for ensuring sustainability as a transformation from the government to private sector healthcare delivery occurs. Moreover, the results of the feasibility of measuring the selected indicators showed that the system is prepared to adopt most of the selected indicators. However, this research used the selected indicators as generic indicators for secondary care hospitals and are not project-based. It is recommended that any future applications of the methodology take a project-based approach rather than a generalised one. More specifically, as and when PPP approach is anticipated for a project, such a process and methodology should be followed to ensure that indicators specific to that project are selected to implement and evaluate the success of the project.

CHAPTER TWO

A Review To Understand The Types And History Of Health-Sector Management Reforms In Saudi Arabia

2.1 Introduction

Saudi Arabia is advancing towards the market and commercial orientation on matters concerning healthcare despite its welfare-based ideological history around healthcare service provision (50). This has made the private sector to rise into a challenging player in Saudi's landscape. It is difficult to isolate this change from the demands of the healthcare system because of a shortage of health professionals, resource limitations, poor information and technology deployment to meet the present needs and the changing population's epidemiological profile (23). The private sector has significantly been involved in the provision of healthcare services which is a new development. Therefore, this provides an opportunity to understand how it affects Saudi's healthcare sector, best practices for the involvement of private sector in the provision of healthcare services as well as the unique barriers, strengths, limitations and opportunities relating to the change in healthcare delivery system governance in the country.

Therefore, this paper aims to closely evaluate the private sector as an important component in the governance of Saudi Arabia's healthcare landscape. Peer-reviewed literature that was retrieved by way of literature search and grey literature which was collected on the basis of expert recommendations were analysed. It helped in understanding the history and types of reforms in the management of health-sector in Saudi Arabia. In addition, the research aimed at a better understanding of how privatisation and private sector partnerships affect healthcare accessibility and quality across Saudi Arabia. The findings of this paper will serve as an informative and easy-

to-use resource for the civil society, policymakers as well as healthcare practitioners in Saudi Arabia even as they administer the country's healthcare incentives and regulations.

2.2 Study Selection

An array of literature on different management styles and the history of management reform in Saudi's healthcare sector were reviewed. The management reforms comprise of the conventional operation of hospitals by the government, self-operation, private sector hospitals and full private sector operation. The literature reviewed was both local and international peer-reviewed and grey literature.

This paper is categorised into four main sections:

1. Healthcare reforms in Saudi Arabia's healthcare system: It gives the general overview of the healthcare systems with extensive research on the past and current situation in order to understand how the system has transformed to get to the present state.
2. Moreover, General description of the public-private partnership concept within the healthcare systems, as well as an overview of the global reform experiences and related interventions in both the third world and developed nations, are discussed in the paper.
3. Saudi's public-private partnerships (PPPs) within the healthcare system: It is an in-depth literature review to determine how PPP projects affect Saudi's healthcare system and examine performance indicators which are used in evaluating the impacts associated with healthcare system privatisation.
4. Saudi healthcare system's barriers and public-private partnership prospects: Obstacles and barriers which come in between in the achievement of the best results from reforms that utilised PPPs to Saudi Arabia's healthcare system were analysed through the review of the

literature.

2.3 Data Extraction

Related articles were primarily searched using seven databases with the first one being the PubMed (*http://www.ncbi.nlm.nih.gov/pubmed*) while the second one is Medline (*http://www.nlm.nih.gov/bsd/pmresources.html*). The two databases are comprehensive and renowned global sources from journal articles associated with healthcare in the majority of the sectors. Google-Scholar (*https://scholar.google.com*) is the third database that was used to search related articles. This is a multidisciplinary database containing a variety of literature. Other databases include the Grey Literature Report on Public Health (*http://www.greylit.org*) and King's Fund Library *http://www.kingsfund.org.uk/library)*.

The two databases are popularly referred to as well-known grey literature comprehensive sources. Another database that was used in searched in the Cochrane Library (*http://www.cochrane.org*), which is a worldwide famous organisation aggregating systematic healthcare research information review. University libraries and the National Saudi Administration Institute's library were consulted for both local grey pieces of literature and Arabic works of literature. Such sources are said to be valid hardcopy repositories of books, articles and masters' as well as PhD's researches. Informal expert snowball was finally carried out within Saudi's healthcare sector. The experts were asked to recommend on grey literature among other peer-reviewed literature sources to be incorporated into this search.

Some of the keywords that were used in the review are: PPPs and healthcare, healthcare and public-private partnership models, healthcare and public-private partnership, privatisation and healthcare, healthcare and Saudi Arabia and public-private partnership, PPP models and

healthcare, Saudi Arabia and healthcare system, healthcare and public-private partnership and performance indicators, Saudi Arabia and healthcare and privatisation, healthcare and privatisation and performance indicators, Saudi Arabia and reforms and healthcare as well as healthcare and PPPs and performance indicators. Other search terms used in the other round of searches include human resources outsourcing, operation outsourcing, self-operation, autonomous management and global budget.

Articles that were written in Arabic or English languages and published in a period between the year 1980 and 2018 were included in the searches. The articles should address the PPP concept in healthcare, managerial and structural healthcare system reforms within Saudi Arabia as well as public partnerships and privatisation concept in the healthcare system in Saudi Arabia. Articles that were published after the year 1980 were reviewed following the fact that healthcare delivery system re-orientation in the private sector partnerships started in the early 1980s (24). One of the languages that received a lot of attention regarding this search was English given that research publications on Saudi's medical system are in English even though the Arabic language is lingua franca. The Arabic language was also used in the search because a lot of media sources and grey literature are in Arabic. However, articles that showed inconsistency with the aim of the manuscripts and those that were duplicated within the database were excluded.

Table 1: Articles incorporated into this review

Geographical Region	Number of Articles	References
Saudi Arabia	32	2,5,6,10,12,13,14,15,18,19,20,21,22,23,24,25, 26,27,28,30,42,45,46,50,51,52,57,58,68,70,72, 75
Global	12	3,9,35,40,41,59,64,66,69,71,73, 74
United States	6	1,7,8,32,37, 39
India	5	31,61,63,65, 67
Australia	4	11,38,43, 47
The Arab World	3	53,54, 55
Europe	2	60, 63
Canada	1	56
China	1	36
France	1	4
GCC	1	62
Iran	1	34
Israel	1	33
Latin America	1	48
Poland	1	49
Qatar	1	16
Uganda	1	17
United Kingdom	1	29

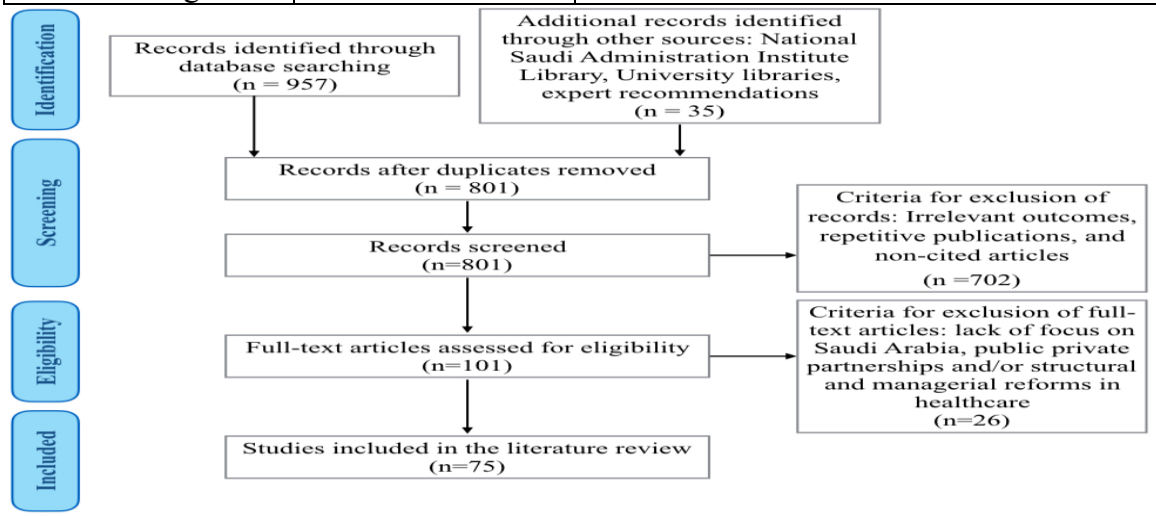

Figure 1: Flow Diagram of the Search and Screening Strategy

2.4 Results

2.4.1 History of Saudi's Healthcare System

There has been a lot of investment on the improvement of healthcare services by the Saudi Arabia government in different healthcare levels, including primary, secondary as well as tertiary levels (24). The healthcare sector has improved in terms of quality, quantity and health service results because it is highly prioritised. For instance, there was an increase in the number of primary care centres from 1800 to about 2030 primary care centres in the period of 5 years (i.e. 2009 - 2014). There was also an increase in life expectancy in Saudi Arabia from 70 to about 72 in a period of the ten years (i.e. 2004-2014) for men. In addition, there was a significant decline in mortality rate from about 250 deaths in every 1000 births in the year 1960 to about 20 deaths in every 1000 births in the year 2009.

On the other hand, the healthcare delivery system in Saudi is still struggling with certain challenges which include insufficient healthcare workers, funding challenges, unclear roles in the health ministry, lack of policy on national crisis management, epidemiological transitions within the population, under-optimised electronic healthcare strategies, poor accessibility to facilities that offer healthcare services and lack of a system that manages national health information (28). The Saudi population mostly utilised traditional treatment in the early 20th century (12) but the establishment of the Department of Health in 1926 enhanced the establishment of healthcare facilities and healthcare systems (34). Healthcare facilities were then re-organised in 1927 through the General Health and Aid Directorate (23).

Mahrous (57) points out that the potential health gains which could have possibly been realised from these strategies were hindered by shortage of health professionals in Saudi Arabia, duplication of roles, limited financial resources, role conflict and ambiguity, lack of a policy on

national management, lack of a system that manages national health information, changing disease patterns, poor accessibility to facilities that offer healthcare services, rising demand for free healthcare services and under-optimisation of electronic healthcare strategies (22). Thus, hindering the success of the 'Western-style' ideal healthcare system. The Ministry of Health was established in 1950 through an announcement by the royal decree (23). The event played a very important role in the healthcare system advancement. Furthermore, 5-year development plans were initiated by the government in 1970 with the aim of improving all sectors, including the healthcare sector (75). Different dimensions like the establishment of Saudi Health Specialties Council and medical centres, emphasising on the development of healthcare professionals and enhancing scholarships were taken by this approach. Consequently, Saudi is ranked 26th based on the healthcare system performance measurement carried out by the World Health Organisation (50). Considerable gains have been realised in the national population health from these investments within the healthcare delivery system.

The Ministry of Health of in Saudi Arabia is responsible for the provision of healthcare services and financing its 2037 primary healthcare centres and 244 hospitals to serve the Saudi population which is about 20 million (7). The services offered exclusively by the health ministry contain 60 per cent of the overall services provided. Teaching hospitals, private sector, referral hospitals and Red Crescent Society are some of the service providers (Figure-3). However, a significant improvement has been recorded within the healthcare system, particularly in accessing the services, but the wastage of resources and efforts has been reported. This was because there is no coordination between the various sectors and service providers (59). There was the issuance of a royal decree in the year 2002 with the aim of establishing Saudi Health Council presented by every governmental sector and the private sector in order to overcome challenges associated with

poor coordination between various players and establish an alignment policy between the various sectors (43).

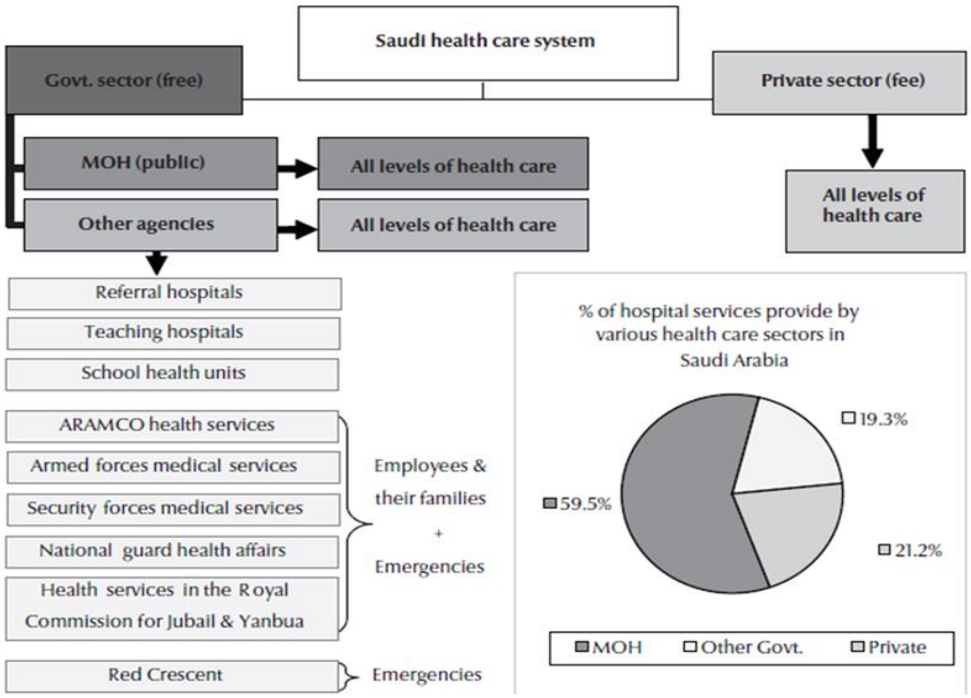

Figure 2: Conceptual framework representing the Healthcare System in Saudi Arabia (23)

Saudi governmental agencies and the Health Ministry are responsible for providing healthcare services to all Saudi government employees and citizens on the basis of the country's constitution (36). The health ministry is also responsible for managing and supervising the private sector and other healthcare governmental sectors in order to realise the government's goals and implement its strategies. It is also involved in monitoring private sector services through regulation of its activities (30, 36). In addition to this, the Ministry of Health's responsibilities is applicable through its office or branch in all the 20 regions across the country (36). The office heads in every region are referred to as General Directors. Several primary care centres and hospitals in the

ministry are under the General Director. They also implement the health ministry's national plans and programs within their respective regions. Moreover, the General Director is mandated with the regulation of private sector practice (30, 36).

Healthcare services are provided by the health ministry as primary care comprises of curative and prevention services via a group of primary care facilities and secondary care via a group of public hospitals as hubs. For referring primary care patients and emergency services as well as the specialised tertiary hospitals for the provision of care for advanced cases like transplant services and cancer treatment (26, 68). Khoja (51) argued that some factors hamper service delivery across Saudi Arabia even though the Ministry of Health has taken a number of steps to reform the Health care system in the country. According to Gardner (39), the rapidly increasing expenditure resulting from population growth within the country is one of the challenges (72). Inadequate supply of healthcare professionals like the pharmacists, physicians and nurses is another challenge (24). Most workers within the healthcare sector are not Saudi natives. Therefore, this has resulted in instability and increased staff turnover. The ministry's Transformation Office also concluded that there are several challenges faced by the Saudi government in realising the healthcare service demands and the ever-increasing costs of healthcare. The following are some of the challenges (2):

1. Low level of patient satisfaction from both primary and secondary healthcare services.
2. Inadequate capacity in health services provided by the government lead to considerable problems relating to long waiting times and access all through the care continuum.
3. Insufficient resources and budgetary constraints due to the rapid increase in the cost of healthcare that places the government at a greater risk of being financially unsustainable.

4. Lack of integrated information systems which majorly cause inefficient operations in primary, secondary and tertiary levels.
5. Insufficient human capital and know-how results in inadequate procedures and operations which eventually retards the delivery of healthcare services and contribute to under-utilisation of resources.
6. Inconsistency in healthcare service quality and the inability to implement safety standards within the ministry's facilities.
7. Heavy reliance on foreign professionals and expatriates because there are no qualified local personnel without any plans to transfer knowledge. This compromises the healthcare delivery system's sustainability.
8. About 5 million pilgrims visit Saudi Arabia on a yearly basis, and this interferes with high-quality and adequate healthcare provision within the country. According to the Quran, there are two holy cities in Saudi Arabia. Sebai (67) poised that it is necessary to establish a comprehensive plan to make sure that transport, housing and healthcare services are adequately provided although free health services are provided to all pilgrims by the Saudi health ministry.

These challenges can effectively be addressed through private sector participation.

2.4.2. Quality Assessment, Improvement and Control in Saudi's Healthcare Delivery System

Saudi's policymakers are aware that accessing better healthcare services helps in ensuring that the wellbeing of the people of the kingdom is well catered for and that its economic stability is safeguarded. The need for critical healthcare services is undeniably rising due to lifestyle

changes and population growth across Saudi Arabia. The changes put pressure on the current healthcare infrastructure. Additionally, public finances are strained by capacity building within the healthcare sector (72). Ensuring healthcare quality standard improvement and maintenance and increased the capacity of local healthcare in remote places are some of the barriers that need to be in order to achieve healthcare needs (15). Quality improvement best practice development contains three distinct phases (12). Nightingale and Codman proposed the first phase. Nightingale, who worked as a nurse in the Crimean War, pointed out that it is important to systematically appraise healthcare delivery systems as well as the relationship between adequate results and suitable care (69). On the other hand, Codman focused on the fact that it is necessary to urgently measure care quality and introduce a common standard in order to enhance medical care quality on the basis of his medical care assessment within the U.S (60).

Codman emphasised on healthcare system restructuring to enhance the creation of improvement avenues. Codman's work relied on 'a 5-standard approach' implementation that is also called the 'minimum standards" (65) which include organisation of hospital medical staff; restriction of staff membership to competent, well-educated and licensed surgeons and physicians; Maintenance of medical records which comprise of physical examination, history and lab results; framing of rules and regulations for enhancing clinical review and regular staff meetings; as well as the establishment of supervised treatment and diagnostic facilities like radiology departments and clinical laboratories. American College of Surgeons came up with standards that guide the accreditation of hospitals with Joint Commission on Hospital Accreditation in the year 1917, thus marking the second quality standard development and implementation phase (39). Moreover, a three-pronged method was created by Donabedian to evaluate the quality of healthcare that eventually ends in a 10-step model to promote quality management of healthcare.

The third phase was linked to a new strategy to the application of quality which was proposed by Baltaden, Berwick and Deming. Both Batalden and Berwick assessed the experience of Japanese tapped industrial sector. These concepts were then applied by the duo into the healthcare sector. On the other hand, Baltaden used Deming's 14 cardinal points to establish a new Quality Assurance course within the healthcare delivery system. The spread of Deming and Baltaden's findings was done by Juran Institute (17). Quality standard development within the healthcare sector took a different dimension in the 1990s with organisations and experts in the quality management field, putting several collaborative efforts to improve healthcare services quality (51). Kronfol (53) points out that many developing countries acknowledged that reducing costs through quality program implementation in the West is very beneficial and have been encouraged to incorporate the same with the aim of promoting healthcare delivery quality. Generally, developing nations were far behind because of a lack of awareness on care quality evaluation, even though developed countries have put a lot of efforts in implementing quality. Healthcare systems in developing countries were in a deplorable state and were characterised by high mortality rates in the 1980s.

Eggleston (37) said that the third world countries, together with their health policy-makers' main concerns were the ways that could be used to increase medical care access in urban centres. Another concern was how budgetary allocation could be increased within the health sector without the need to reflect on how quality assurance programs can be introduced and executed with the associated advantages. On the other hand, Alkhamis (20) points out that Saudi Arabia prioritises on the improvement of the quality and centres of healthcare as well as the priority in the country's decision-making processes. Saudi's health ministry made the provision of primary healthcare a priority in 1984 hence the establishment of National Quality Assurance Committee in 1993 by the

ministry which also produced quality assurance program guidelines in primary healthcare centres whose improvement was done by WHO (40). Additionally, a program on management development was initiated in the year 1995 with the aim of preparing regional supervisors to carry out key roles in efforts that are geared towards the improvement of primary healthcare quality (33).

2.4.3 Private Sector Partnerships in Saudi Healthcare Delivery System

PPPs or Public-Private Partnerships comprise of three words, i.e. public, private and partnership. In the first word, the public sector involves institutions or organisations under the financing of state revenue. These organisations function under the control and budgets of the government. In the second word, the private sector encompasses individuals and organisations whose work is not directly controlled by the state (30). It broadly includes every non-state actor, i.e. for-profit and not-for-profit (NFP) actors. The for-profit actors are conventionally referred to as private enterprises, while the NFP actors are known as NGOs (non-governmental organisations).

Jarallah (46) noted that for-profit providers operating within the health sector could include diagnostic centres, blood banks, individual physicians, polyclinics, ambulance operators, hospitals of different capacities, commercial contractors as well as nursing homes. These for-profit actors may also involve community service extensions of co-operative societies, industrial establishments and professional associations. However, Drechsler (35) argued that the NFP providers within the healthcare sector include a diverse group of facilities and practitioners. NGOs are different in terms of expertise level, size and geographical spread. Not-for-profit services are always found in charitable hospitals and clinics. There are some NFP actors who are funded from

user-charges and have a sustainable financial establishment. However, many of them either need donation or grant support (20).

Akinci (29) says that the third word in the PPPs, i.e. partnership comprises of any interaction that exists between private and public actors. Partnership normally describes many different inter-organisational collaborations and relationships. PPPs (public private partnerships) therefore refer to different co-operative arrangements between private and public sectors aimed at delivering public goods/services as well as providing a means through which the non-governmental sector coordinates with the government to carry out comprehensive and integrated efforts for the fulfilment of community needs (32).

The establishment of PPPs was informed by the governments' desire to control public spending and share the risk while enabling the private and public sector entities to put more emphasis on the common objectives. World Bank (73) further elaborates that public private partnerships are long-term contracts signed between governments and private parties to provide public services or assets where the private party is responsible for the management and bears the significant risk. However, remuneration is directly dependent on performance. On the other hand, Al-Jazaeri et al. (18) asserted that a stewardship model is the basis of public private partnerships where the private sector entity is more aggressive on project aspects that previously excluded it using a traditional procurement method like operations, maintenance, design and financing. Several arrangements are included in PPPs. For instance, initial capital injection by private entities is a very important element in most of the PPPs operating in the health (16). Scope of services covered by public private partnerships within the healthcare sector differs. Furthermore, PPPs can help in increasing access to high-quality healthcare by leveraging managerial capacity, capital, and knowledge from private entities.

Public private partnerships are contractual agreements in which all or part of government functions or services are delivered by a private partner (38). The strategy is used in the healthcare sector to address problems relating to social development and public health through joint efforts of development organisations private and public entities. According to Khoja (51), every partner in public private partnership arrangement contributes to the respective special competence area, thus bringing in expertise which is always unavailable within the development projects. Partners in public private partnership meet over a common goal with the ability to pursue certain goals in every organisation (14). If the strategy is correctly used, it is capable of supporting the health ministry to meet its goals cost-effectively and with speed. Private sector organisations can venture into new markets, contribute to communities in which their businesses operate and develop new marketing techniques (16). PPPs share the risks, investments, rewards and responsibilities between the partners. In addition, Ali (16) says that PPPs are mostly established with the aim of supporting service provision and public infrastructure through the financing, design, management as well as operation and maintenance stages. A partnership drawing on public and private sector strengths in establishing a complementary relationship is a very effective arrangement (19).

In the process of expanding the capacity of its health care systems, Saudi Arabia still faces many problems. Some of the problems include a lack of funds. In the whole kingdom, healthcare services are provided by the government under the ministry of health. The funding is, however, done by the Ministry of Finance, as asserted by Chapman (32). Most of the healthcare facilities work under the Ministry of Health. This means that before carrying out any activity, a consultation to the ministry has to be made. This type of top-down intervention limits the facilities in the application of quality management. Financing the healthcare facilities for the provision of good healthcare services has always been a big, very challenge in Saudi Arabian Ministry of Health

despite the allocation of funds and resources. Despite all these challenges, the country continues to invest in healthcare systems and better its healthcare infrastructure (68).

In a bid to catch up with several other countries within the GCC (Gulf Co-operation Council) and globally, the private sector is currently being embraced by the Saudi government. Private health coverage has been introduced in the country has introduced as one of the initial steps. Most if not all, of Saudi Arabia's healthcare facilities and state hospitals, will be subjected to privatisation with time (22). To address this problem, government incentives have been set aside with the aim of attracting private investors to expand the country's healthcare capacity. For instance, the government has provided loans of up to SR200 million to local firms for construction of healthcare infrastructure at favourable rates. Chapman (32) noted that Saudi Arabia is facing an acute scarcity of local healthcare professionals. However, the Saudi government is making some attempts that will eventually raise the number of native healthcare professionals. According to Chapman, only five medical colleges had been established across the country by the year 2000. He says that the medical colleges were insufficient to meet Saudi's population needs. However, there are several new private and government institutes that were established to supplement the existing ones. By the year 2012, Saudi Arabia had established 21 medical colleges, but the number of colleges can further be increased to cater to the growing demand for healthcare service provision. It is also necessary to invest in the capacity of medical professionals in the country (68). The government supported the private sector to establish most of the medical colleges.

The need for medical professionals who will work in the healthcare facilities in that have already been expanded is more than the existing Saudi manpower despite the fact that the health ministry has made some frantic efforts to raise the amount of Saudi healthcare professionals whose speciality is quality management (38). Foreign healthcare professionals should, therefore, be

engaged in filling the gap created by this situation. 76% of nurses and 78.7% of physicians who were working in Saudi Arabia in 2006 were from other countries (38). However, this is a worrisome situation since there is 37% medical workforce turnover in Saudi Arabia, as noted by Al-Ahmadi (12). On the other hand, Jarallah (46) poised that it is necessary for the government to government to create policies aimed at increasing the number of Saudi healthcare professionals. In 2003, the Saudi Labor Force Council adopted some strategies for raising the country's health workforce. Some of the strategies include funding postgraduate medical science studies and promoting medical training institution financing by the private sector (46). The Saudi government is committed to raising the quality of its healthcare. However, the government's efforts are focused on the health workforce at the expense of quality management professionals (51).

Most of the people who work in Saudi Arabia as healthcare professionals are emigrants, and this makes language another challenge. Many of the expatriates are non-Arabic speaking, yet English is not commonly used by the Saudi people (51), thus creating a language barrier between the medical health practitioners and patients. An increase in the number of local healthcare practitioners helps in solving this problem. Offering courses in the Arabic language could also help non-Arabic speaking professionals.

2.5 Methods for General Hospital Privatisation

Different countries have different methods of hospital privatisation, but either the following methods are used by Saudi's system of government (2):

1. The partnership of hospital ownership between the private sector and the government. This method helps the two entities to operate and manage the assets together as the government directly influences decision making.

2. Transferring hospital ownership with all the assets from the government to the private sector, which will then exclusively own, operate, manage and maintain the hospital without being interfered by the government.
3. Operating and managing the contract in which the facility is owned by the government, which is also responsible for supervising private sector performance in facility operation and management.
4. Leasing of hospital assets to the private sector entity by the government on a long-term basis without directly influencing the facility management and operation
5. Consulting and supervision services where the private sector entity provides guidance and supervision only because it does not have any direct operational services.

2.6. Public-Private Partnerships Models

There are many schemes and models of the public-private partnership concept, but the following were adopted in this article having been listed by the IMF (International Monetary Fund) (3,31):

Table 2: Modalities and Schemes of Public-Private Partnership

Scheme	Modalities
Build-develop-operate (BDO) Build-own-operate (BOO) Design-construct-manage-finance	The private sector creates a design, builds, develops, owns, manages and operates an asset without any obligation for transferring ownership to a government entity. They are DBFO (design-build-finance operate) variant schemes.
Lease-develop-operate (LDO) Buy-build-operate (BBO) Wrap-around addition (WAA)	The government leases or sells a current asset to the private sector, which then modernises, renovates, expands and operates it without any obligation for transferring ownership to the government.
Build-own-operate-transfer (BOOT) Build-operate-transfer (BOT)	An asset is designed, built, operated and transferred to the government entity by the private sector at the end of the contract on the operation or any other period of time that is

	pre-specified. The asset may either be leased or rented from the government by the private partner.
Build-rent-own-transfer (BROT) Build-lease-operate-transfer (BLOT) Build-transfer-operate (BTO)	The asset may subsequently be leased or rented from a public entity by the private partner.

Source: Department of Fiscal Affairs, IMF

There are a number of initiatives that have been adopted by Saudi Ministry of Health and government during the past four decades with the aim of collaborating with private sector entities and utilising them through local or international entities. Furthermore, there are some firms that have in the past been taken by the collaboration between government and private sectors within Saudi healthcare (2,75). These include:

1. *Partial Operations*: The health ministry was in the mid-80s mandated by the government to directly contract multinational and local and private organisations and to provide certain management and operational services like human medical capital and clinical services. By this time, the management team and administrators were still employees in the Ministry of Health, and this hampered the achievement of performance (2).
2. *Government- Government Collaborations:* Saudi Government partnered with many other governments in the early 80s in a bid to help the health ministry in managing new healthcare facilities via the local companies and their experiences. Some of the countries supporting the health ministry with management and administration experts and human capital are UK, China, Germany and Denmark.
3. *Comprehensive Operations*: A new model known as ‘comprehensive operations' was adopted by the Saudi health ministry in the '80s after experiencing government-government and partial operation. It involved empowering private sector entities through contracts and

expanding operational service purview to incorporate not only medical operations but also support and maintenance services. The model was hampered by the fact that over 50 per cent of employees designated to the administration department were employees in the health ministry that created mismanagement and redundancy (overlapping authorities) (2).

4. *Total Operations*: The private sector is authorised through the contract to manage and operate every service offered in public healthcare facilities. However, there should be a liaison office in every hospital to liaise between the ministry and facility management.
5. *Self-Operation*: The health ministry invented this model to operate healthcare facilities using private sector methods as well as to adopt a similar salary scale and benefits for the workers while separating the management team from bureaucracies that exist in the Ministry.

2.6.1 Global Private Sector Partnerships

Evaluating long-term and short-term realities are very important for understanding how privatisation affects different areas of service. Privatisation of assets and facilities may result in a reduction in savings and costs within the short-term but may differ with long-term objectives. According to Macdonald (56), privatising health services is not a mere response to the government's fiscal crises; neither is it a universal conspiracy aimed at rolling back the state of welfare. However, Macdonald points out that privatising health services is dependent on the nature of conflict within the private sector, state, capital and health care consumers. Privatisation initiative results can be affected by social, economic and political context. Literature review on healthcare service privatisation indicates that the issues raised on privatisation, i.e. those that support or condemn it are unclear (75).

Theoretically, privatising healthcare services may result in increased quality and efficiency in healthcare goods provision, high competition within the market, minimise costs and improve choice. However, these theoretical propositions can hardly be translated into results without any suitable design and implementation. Mansour (58) points out that the difficulty in the implementation of any privatisation initiatives can be caused by two factors i.e. failure of parties involved in the design and implementation of the process to be patient, trust or understand the basic privatisation " philosophy" thus causing inappropriate structuring of incentives and other design issues as well as political constraints that compromise efforts directed at well-designed privatisation.

Selective contracting by way of competitive bidding in the US is a good example of the manner in which implementation difficulties may need a greater government involvement during the bidding process that evidently undermines the impact of real price-cutting of private sector entities (13). Great Britain is experienced in contracting-out, and this is a clear indication of how political constraints can result in non-economical choices. United States' experience in Medicaid managed care, and Great Britain's experience in the provision of private nursing home services also shows how it is important to put in place suitable monitoring mechanisms to ensure that the private sector provides quality care and that consumers are protected against adverse effects resulting from privatisation (25). Additionally, Canada’s case clearly shows how it is important to evaluate individual proposals on privatisation against well-specified objectives of health policy regardless of the country in which healthcare service privatisation is considered to be a feasible policy option (75). Furthermore, it is clearly documented that unrealistic time frames and hasty implementation of privatisation initiatives and immature private market systems may result in a

number of practice compromises and redesigns with regards to the Czech Republic, Russia and Hungary's experiences (23).

2.6.2. Risks and Impacts of PPPs (Public-Private Partnerships)

Public private partnerships are different from the conventional models of infrastructure financing because the public partner can set performance-based indicators and pass these to the maintenance or construction contractors and the private partner through the supply chain (21). Mechanisms like penalties and deductions can be used in public private partnerships in case the contractor does not meet the set targets or fails to perform. In such a case, the public sector takes control to some extent (31). If well mastered, PPP contracts are capable of carrying clearly defined and immediate penalties and compliance criteria. This helps in promoting compliance, thus leading to beneficial outcomes (24). Formalising output-based result monitoring is beneficial to the health sector as far as improved health outcomes and outputs are concerned.

2.6.3. Risks involved in Public-Private Partnership Delivery

Private Sector Partnership delivery has some potential risks that are necessarily important to discuss (31). On the other hand, there are some general risks relating to PPP delivery models based on contract complexity and long-term commitments of a number of Private Sector Partnership agreements:

- Most agreements in Private Sector Partnership incur some basic fiscal costs to the government entity. Deliberations on the value for money, especially in the UK's PFI projects (Public Finance Initiative) emphasised on social infrastructures like hospitals and schools, are prevalent.

- Contracts in Private Sector Partnership may be very complex in their administration and implementation in relation to standard service procurement routes (68).
- Negotiation of contracts between the parties and getting into a consensus may need long time scales, and this is likely to delay the much-needed development and investment.
- Close regulatory oversight may also be necessary for Private Sector Partnership Schemes in ensuring that delivery and performance meet the suitable standards (28).
- Contingent liabilities are often yielded by Private Sector Partnership schemes on the government entity in both medium-term and long-term.

Public sector guarantees underwrite most of the risks, whereas the private sector bears them. On the other hand, there are certain instances in which disadvantaged women are risked by Private Sector Partnership model. Efficiency in the private sector may entail the employment of very few women with poor salaries if careful quality controls are not put in place thus resulting in gender-based disparities and other actions that negatively affect the female gender (28).

2.6.4 Performance Indicators for Public-Private Partnership Monitoring

Provision and operation of healthcare services can be tracked using key performance indicators which may be influenced by asset management plans when PPP is established and their modification throughout the partnership period (26). The following are best practices for the monitoring of optimal public private partnership as established in the reviewed literature.

1. *Focusing on outputs, outcomes and processes*: PPP performance measures are not only focused on outputs and processes but also outcomes (Donabedian, 1966). This has developed into from negotiation of key outcomes from sponsorship of governmental

agencies like Saudi Ministry of Health and CBAHI to promulgate a number of regulatory measures (67). The negotiation gives the contractor or local government the ability to learn how results are achieved results instead of dictating that local governments or the contractor achieve a number of detailed performance indicators.

2. *Use incentives*: The incentives that are used may either be positive or negative. However, negative incentives are more prevalent. On the other hand, positive incentives are generally related to the overall contractor performance, whereas negative incentives are related to compliance with asset requirements or a specified service. Incentives can either be outcome-based incentives like payments, deductions or penalties.
3. *Focusing on both asset conditions and service requirements:* Key performance indicators and specific performance measures are used in different types of projects and cases within the healthcare sector. The recent need to use performance indicators shows that more emphasis is directed to the projects and service requirements compared to asset management or condition.
4. *Creating a culture of asset management:* The need to create a continuous culture of asset management which promotes high service level throughout the contract and that preserves the outstanding service life at the point of handover appeared to be a recurrent theme in the reviewed papers (66).
5. *Focusing on hand back provisions*: These provisions are focused on assets and take the negative incentive form whose target is on compliance (26). Hand back provisions are effort-intensive more so during the auditing stage towards the end of the contract, thus encouraging disputes. However, it is important to note that the measures are very helpful.

2.6.5. The Future of PPPs

Al Yousuf et al. (27) stated that public private partnerships are a new approach used to extend the scope and reach healthcare delivery systems globally. As the government supports the civil society, corporate entities and the private companies also join the government in supporting this group of the society. Challenges experienced by healthcare delivery systems and possible steps for the use of PPPs to solve the challenges are discussed below.

Recruitment of qualified medical professionals is very costly for healthcare providers as it takes the largest share in the budget. Many Saudi paramedical staff, doctors and nurses move to Western countries which have stable training facilities and work opportunities after a number of years. Sebai, Milaat and Al-Zulaiabani (67) argue that the current Saudi Arabian regulations on "Saudization" and enrolment increase staffing costs due to limited resources (51). It is because of the rising health expenditures and population that is making the government change the healthcare system considerably. By the year 2020, people who will be over 60 years are estimated to be more than 2.5 million (21). The ageing population is expected to increase healthcare expenditures and demand. On the other hand, the Saudi population of obese people is increasing g at an exponential rate. This condition is associated with a number of illnesses that increase healthcare demand (20). There has been a rapid increase in healthcare costs, thus worsening these conditions.

In its survey, World Health Organisation ranked Saudi healthcare system at number 26 out of 190 global healthcare delivery systems with the overall public health expenditure in the year 2009 standing at 5 per cent of the country's GDP (Gross Domestic Product) as noted by Alkhamis (20). The Saudi Arabian government has made a lot of efforts to meet the increase g demand for healthcare. However, there are still some challenges that should be through proper planning and management. With high life expectancy, there is a rising healthcare demand for the aged bearing

in mind that healthcare costs are also increasing. In addition, cases of lifestyle-related illnesses are increasing in Saudi Arabia amid a high population growth rate. Alkhamis (20) says that these changes put pressure on the healthcare system in Saudi Arabia. Other challenges faced by the healthcare system in Saudi Arabia include:

1. *Resource underutilisation:* All Saudi citizens can access free healthcare. Sometimes, this may result in health service over utilisation by patients. Most of the hospitals have sophisticated equipment which is sometimes used to treat minor cases. Very expensive equipment in the hospitals is not being put into use due to the lack of trained personnel (21). Different hospitals may have similar equipment which in most cases are not utilised, and this is attributed to the fact that hospitals lack proper coordination (26). This problem is also caused by a lack of accountability. Most of the Saudi government agencies help in the provision of healthcare services. There are no well-defined mechanisms for the agencies to coordinate properly, thus resulting in wastage of resources and duplication of effort (27).
2. *Unequal resources distribution:* Many specialised hospitals in private and hospital sectors with professional and highly qualified personnel and state-of-the-art equipment are found in big cities while hospitals in rural areas lack proper infrastructure (25, 27).
3. *Prevalence of chronic diseases*: Lifestyle diseases like hypertension, diabetes, genetic blood disorders, heart diseases, childhood obesity and cancer are on the rise in Saudi Arabia. Such diseases are a financial burden on the healthcare system in Saudi Arabia. This problem can be reduced by taking preventive measures. Behavioural health interventions and health education are necessary for stalling the effects resulting from these trends (33).

The following are the recommendations on improvement of PPP effects on Saudi's quality of healthcare services and outcomes:

- Clear details of input and output factors which are capable of affecting PPP outcomes should be provided.
- The delivery of healthcare services needs to be discussed, assessed and implemented through the use of a strategic delivery framework whose development should be under the ministry's leadership. The framework must also integrate healthcare needs in Saudi Arabia and its determinants.
- The best way to improve the system's assessment of aspects through public private partnership needs to be undertaken. The evaluation will inform cost-effective and efficient model development (40).
- Application of evidence-based and monitoring of the incentive structure should continually be made by the health ministry in order to inform PPP focus on ensuring that they meet the needs of the population (18). This ensures a constant balance between different interests like performance investments, ensuring cost-effectiveness, the country's healthcare needs and private player interests.

2.7 Conclusion

In Saudi Arabia, the healthcare system that is being used does not address the developing healthcare needs of its people. The Saudi government is currently overwhelmed with healthcare costs. As such, private sector participation will be very helpful in boosting healthcare system development within the country as well as effective and efficient delivery of care services. The ever-growing population and increased affluence-related diseases are expected to increase

healthcare demand further. Policymakers recommend private sector participation to sustain the increasing population. This kind of development will enable foreign companies providing healthcare services to participate in the Middle East's largest healthcare market.

Public private partnerships provide a solution to traditional procurement. However, PPPs have their own merits and demerits. PPPs generally involve putting together various activities including construction, operation and maintenance of services in conjunction with private partners sharing the same benefits and risks with the public sector. This is bound by the private ownership principle with related assets. Public private partnerships are hampered by some legislative barriers as a way of enhancing municipal services. To address deficiencies in municipal service delivery quality, it is important for municipalities to develop strategies which take public private partnership into account as part of approaches for overcoming the deficiencies. This is common in services incorporating construction, operation and maintenance. The development of a good strategy to improve municipal services needs municipalities to move towards the public private partnerships. However, they should differentiate core activities from non-core activities for municipal authorities to select a suitable improvement strategy.

To enable municipalities, implement their strategies on the provision of healthcare services, a lot more assessment research is crucial in order to expand their knowledge base thus providing them with practical procedures and approaches for development and implementation of their service delivery improvement strategy. Furthermore, having a method for soliciting the perspectives of main stakeholders in detraining the outcome and an initiative process like PPPs will be very helpful. Future studies should not only process, structure and short-term outcomes but also encompass assessment of long-term sustainability and impacts. Additionally, PPP performance can be measured through indicators. It is, however, important to provide contractual

flexibility for assessment of the need to customise, change or add suitable indicators into the measurement list.

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CHAPTER THREE

Selecting Performance Indicators for Public-Private Partnerships (PPPs) in Healthcare Sector in Saudi Arabia

3.1 Introduction

The Ministry of Health in Saudi Arabia is struggling with specific areas related to the quality of care, and access to care of the healthcare system (9). When these concerns first started to burden the Ministry of Health and other governmental entities, multiple management styles and reforms were proposed. Building, operating, and managing healthcare services through public-private partnerships (PPPs) was recognised as a potential solution for such healthcare issues (1,9). However, PPPs, as a solution, are not new to the healthcare system in Saudi Arabia (1) as sufficient research was not done to determine the effectiveness of PPPs and as a solution that could lead to provision of good quality healthcare services. Evidences also failed to determine the operative models and indicators that could best assess PPPs, in terms of collaboration between the public and private sectors as a solution or intervention to resolve issues related to healthcare services. These issues include the following: (a) quality by "delivering health care that is adherent to an evidence base and results in improved health outcomes for individuals and communities, based on need" (19) and (b) accessibility by "delivering health care that is timely, geographically reasonable, and provided in a setting where skills and resources are appropriate to medical need" (21). Currently, the decision-makers and leaders in the healthcare system are considering adopting more partnerships with the private sector to improve the healthcare system in Saudi Arabia (16).

However, the main concern for healthcare professionals revolve around the ability to make decisions based on the performance indicators, to ensure that such an intervention would help

achieve goals. Presented research proposal and subsequent research work for this paper is an effort to address this gap (2).

3.2 Research Question

What quality and accessibility performance indicators should be applied for successful implementation of a contractual partnership agreement between the public and private sectors for the hospitals services in Saudi Arabia?

3.2.1 Research Problem

The decision makers and leaders in the healthcare sector in Saudi Arabia are considering adoption of reforms related to public-private partnerships (PPPs) as solutions to healthcare systems in order to address the problems with quality of care and accessibility (1, 2, 3, 14, 16). However, no clearly identified and selected performance indicators have been determined for proposed reforms or recommended methods to measure the potential of contractual agreements in reaching the expectations and lead to positive progress and improvement toward well-defined goals from professional perspectives (1,2).

The aim of this study is to *identify and select performance indicators for public-private partnership (PPPs) projects for the Saudi healthcare system* by using a quantitative questionnaire which was used as a guidance for the interviews with experts with a list of recognised and valid sources of healthcare performance indicators for secondary care hospitals. In this paper, the primary focus is on generic performance indicators for secondary care hospitals in the two main domains of quality, and equity/accessibility. These domains are in the context of the three main aspects and types of indicators: structure, process, and outcomes.

3.2.2 Research Objective

The objective of this study is to provide the opportunity to the experts from the healthcare system to select and recommend a list of performance indicators from valid, well-established and recognised sources of performance indicators. Additionally, experts will also be provided opportunities to measure the progress of adoption of public-private partnerships in healthcare system in Saudi Arabia for secondary care hospitals from quality and accessibility perspectives. These propositions would be based on the application of the indicators and need built on experts' knowledge and experience.

3.2.3 Methodology

Modified Delphi technique has been used which is considered as a valid method for reaching consensus and selecting performance indicators (5,7). The Delphi technique was developed by RAND Corporation in 1969 (9,17), where it was used on a group of experts providing anonymous feedback on a valid and structured questionnaire. Moreover, usually the purpose of Delphi technique design is for building, exploring, evaluating and testing based on a level of agreement between experts. These experts, can be homogenous or heterogeneous and the level of agreement between experts is measured between two to ten rounds of reviewing the feedback (17).

3.2.4 Questionnaire

The questionnaire comprised of two modules. The first module was used to gather the demographic data of the experts and their professional qualifications. The second module is a list of performance indicators from professional organisations. This module had two sets of questions; a) quality and b) accessibility indicators.

The selected performance indicators from the validated sources fulfilled the following criteria (Appendix: Sample from the questionnaire for rounds 1 and 2). They have sufficient description and definition of operational information of the indicator. In other words, they can be expressed as a numerator and denominator. For example, percentage of patients stayed in ER for more than 6 hours which is described as Numerator i.e. number of patients stayed in the ER for more than 6 hours from the registration time. Denominator indicates total number of patients visiting the ER department. After identification of the indicators that are similar and have the same wording, indicators or words expressed most clearly among others were picked. Moreover, the ones with similar measures but different thresholds were combined. For example, the percentage of patients that stayed in ER for more than six hours, or eight hours. Then, selected performance indicators from this review were classified into the two domains; Quality of Care, and Accessibility. In this part, the performance indicators have a quantitative section, in which the experts chose from a Likert-type scale from one to five (where one is the lowest recommended score for that performance indicator and five is the highest score). Additionally, there was an area where the experts could recommend and suggest other performance indicators from outside the list, based on their knowledge and professional experience.

3.3 Sources of Indicators

The performance indicators have been selected from national and international recognised professional organisations, including CBAHI (www.cbahi.org)(6), AHRQ (www.ahrq.gov)(4), JCI (www.jointcommissioninternational.org/), and OECD (10).

Table 3: Number of indicators selected for the questionnaire

Number of Indicators								
	Quality	**Clinical**	**Patient Safety**	**Patient-Centred**	**Accessibility**	**Access to Care**	**Barriers**	**Professional Ability**
AHRQ		36	27	6		12	13	12
OECD		23	0	0		5	7	6
CBAHI		15	16	0		0	0	0
JCI		36	0	0		0	0	0

3.4 Selection of Experts

The group who worked on identifying the quality and accessibility indicators were the experts who had been defined as healthcare professionals who have worked for more than five years. The group included the professionals who have worked in quality of care, healthcare system management, hospital administration, patient safety, healthcare human resources and contracting in governmental hospitals, private hospitals, the Ministry of Health, or other governmental authorities such as Saudi Council of Health Services and CBAHI. The number of experts in the sample for this paper is 18 and based on RAND manual, regarding the number of experts in each group that need to reach consensus which is 12 to 20 experts (5, 7, 9, 15). The heterogeneity of the professional background of experts involved in the Delphi technique panels is preferred (15).

After each round, the experts received a summary of the results of the previous round to give each of them the opportunity to review his or her answers based on feedback from the others

but anonymously. Interview of 18 experts was conducted in the first round and 17 in the second round.

Table 4: Expert Profiles

Experts	Governmental Employees	Private Sector Employees	Quality Directors	Other Positions
Round 1				
18	14	4	10	8
Round 2				
17	13	4	9	8

3.4.1 Interactive Sessions

Every expert was required to come up with scorings that pertains to each performance indicator through interactive sessions between the researcher as interviewer and each one of the experts in a form of interview. The experts' feedback was later sent for statistical analysis, and the experts received the feedback in the form of a summary statistical representation of their responses. Then, the cycle was repeated until the experts reached a certain level of agreement on each indicator. Normally, the target agreement level is 100% (9,15) however, literature supports the possibility of modifying this target based on the targets of each project (19,15). A modified target was approached based on agreement level of 90% as aggregated scores from experts' feedback and weighted scores between rounds.. This strategy enabled researcher to consider adopting and selecting the consensus of the performance indicators while taking in consideration the agreement scores which were pooled from the two rounds; to minimise the impact of the feedback opinions in changing the scores for each expert. The interactive sessions involved three rounds;

Round 0 (Pilot)

The pilot round was conducted with two experts, the quality director of King Fahad University Hospital and the supervisor of University Hospital Transformation Plan. The main goals of the pilot were to make sure that the interview setting is suitable in terms of time and location. Also, to make sure the questions and method were clear to the experts and comprehensible.

Round 1

For this round, a quantitative questionnaire was distributed to the experts. The questionnaire focused on exploring what the useful performance indicators are for PPP projects in healthcare in Saudi Arabia. The questionnaire was designed based on a Likert scale (1 to 5) for each proposed performance indicator and was rated by the experts by answering questions from in-person interviews, phone calls, or by email. Based on relevance and reproducibility, a positive consensus was proposed to be defined as 80% of more for scoring four and above, while a negative consensus will be defined as 80% of a score of two or below.

Round 2

In these rounds, the same scale was used, and the questionnaire design included a summary of the results of the first round to give the expert an opportunity to change his/her response based on what was expressed by the other experts in the second round.

Round 3, 4 and So on

There was identified no need to conduct more rounds because the agreement between round one and two was high with no significant difference between round 1 and 2.

3.4.2 Target hospitals

The settings for selecting the performance indicators in the two selected domains are the secondary care hospitals in the Ministry of Health. The reason for having governmental hospitals only in Ministry of Health as a sector is that, it is the sector that is considering adopting public-private partnerships as a model Moreover, it is the sector that is serves the general public and has accessibility for free treatment.

3.4.3 Format of questionnaire delivery

In-person interviews were conducted in experts' offices or meeting rooms for two hours for the first round, and SurveyMonkey surveys were used to administer the electronic questionnaires for the second round.

3.4.4 Variables and measures

The study have independent variables, including the experts' demographic ID, academic degree (Bachelor, Master, PhD, or Board) with a space to determine the name of the degree, gender (male, female), name of the organisation, organisation sponsor (Ministry of Health, Ministry of Education, CBAHI, Private, or other), position (CEO, COO, CMO, CFO, Director of Quality Department, Researcher, or other), number of years of experience working in the healthcare system (<5 years, 5 to 10 years, >10 years). These independent variables were needed to provide opportunity to use the covariates to create a stratum for the comparison between different opinions and feedback, by increasing the sample in the future to make it feasible if the stratum is needed.

The dependent variable in this evaluation are the scoring results based on the Likert-type scale from one to five. The performance indicators are divided into two main domains: quality and accessibility. The consensus target is to reach 90% aggregated agreement to select any specific indicator with a score of four or more. The questionnaire has description of each performance indicator, its type, and an identified numerator and denominator. The selection by the experts was based on the relevance and reproducibility of their selected indicators.

Table 5: Variables table is below (PIs: performance indicators)

Independent Variables	Dependent Variables	Indicators	
		Outcome	Impact
Expert Demographic Experience in years Position of the expert Academic Degree Sponsorship organisation	Likert Score by Expert for 1. Quality PIs 2. Accessibility PIs	On each scale, the score of the PI will be measured from the experts in rounds 1 and 2	The score of 4 or more and 90% agreement between the experts are the PIs that will be selected and the recommended PIs for the PPPs project in secondary care hospitals in Saudi Arabia in the three determined domains.

3.5 Methods

3.5.1 Data collection

In this project, researcher as a principal investigator coordinated the project and led the team. For the first round, in-person interviews with the experts were conducted by the researcher. In each venue for the in-person meetings or phone calls in round 1, researcher contributed two hours in accompanying the experts, explaining the researcher criteria, objectives, and goals. Later, experts were asked to provide a score for each indicator. Questions had a scale from 1 to 5 in each

item, and a subscale with 1 meaning *strongly disagree* and 5 meaning *strongly agree*. The reason for having interviewers use mixed methods for the first round between phone calls and in-person interviews was to ensure that the experts understand the list of performance indicators and the aims of this round. Additionally, it was to increase the probability of having a higher return of feedback. In the subsequent rounds, the statistical results were sent back with an electronic questionnaire using SurveyMonkey. The results were sent back to the experts to review the feedback of each other and have the opportunity to change their responses. A trained interviewer followed up by calling and emailing the experts to remind them about the feedback.

3.6 Analysis Plan

The responses of each performance indicator were analysed by using descriptive statistics and then sent back with the results to the experts with the identical questionnaire to review their answers. The identity of the experts was kept anonymous for the analysis team. Each domain was considered to be one module. The score depends on whether the item was considered as a favourable opinion or not by the experts. The outcome of favourable words was recorded with higher scores to reflect greater agreement, so there will be precoding of responses, where 1 is *strongly disagreed* and 5 is *strongly agreed*.

Individual answers of experts from round 1 and 2 were compiled and aggregated in one dataset for each module. We then analysed each set of answers from each round separately, followed by comparing the mean scores from round 1 to the mean scores from round 2 as weighted score between rounds. Questions from the 1st round were named with an upper case "Q" followed by the question number; for the 2nd round questions were named "q" followed by the number, that

way we distinguished question between rounds. The analyst was blinded from the question details. The following 6 datasets were generated:

1. Clinical care module
2. Patient safety
3. Patient-centred care
4. Barriers
5. Ability of provider
6. Accessibility to care

For those questions with an imperfect correlation (<1.0), mean scores were computed for each question within each round. Absolute differences in mean scores of each question were then calculated the to assess the difference between rounds 1 and 2, and later tested with Student's paired t-test. Relative differences were calculated for each question as percent change between round 1 and 2, using the mean score of rounds 1 with starting point as follows:

[(mean score for round 2 - mean score of round 1) / mean score of round 1] *100

The analysis plan at this level enabled understanding if there is a need to conduct more rounds or not. Calculations were performed in STATA version 13. (StataCorp, College Station, Texas). Then, final scores of each indicator (from round one and round two) in each module were obtained from the original dataset. The mean of the final scores was calculated (score from round 1 + score from round 2 / 2) to identify the indicators with high scores. After that, the list of indicators that satisfies 4 different cut-offs of agreement between experts (80%, 85%, 90% and 95%) were presented in the results section, by each module.

3.7 Results

There were two main themes 1) Quality and 2) Accessibility.

Each theme had several modules as below:

1) Quality
    a. Clinical care module
    b. Patient safety
    c. Patient-centred care
2) Accessibility
    a. Barriers
    b. Ability of provider
    c. Accessibility to care

The results are divided into two main levels:

Level 1. Discrepancy between the first and second round to decide if more rounds are needed

Correlation matrices for questions between rounds for each module are included in the appendix section (Tables 22- a to f). For the quality domain, in the clinical care module, there were 17 (34%) indicators with imperfect correlations between rounds 1 and 2 (table 14). The patient safety module had 10 (37%) indicators with differences (table 15), and the patient centred module had 5 (83%) (table 16). Tables 14, 15, and 16 present the results of the mean score of each question in each round, including the absolute and relative differences in scores between rounds. Indicators with perfect correlation are listed (table 17) for the whole theme.

a. Clinical care module – For the 17 indicators in table-14 of the clinical care module,

3 had the same mean scores for both rounds, when they were compared answer by answer differences were noted between rounds that ranged from -1 to 2. The highest relative difference was found for Acute stroke mortality rate (34) (11.7 %) which corresponded to a higher mean in round 2 by 0.39 points, however this difference was not statistically significant. The Gastrointestinal mortality rate (35) and Postoperative respiratory failure rate (41) followed with relative differences of 7% and 6.22% respectively.

b. Patient safety – From table-15, Hospital infection rate based on diagnosis (14), Hospital infection rate based on procedures (15) and Hospital acquired MRSA (16) had the highest relative differences for the patient safety module; 6.22%, 5.31% and 4.71% respectively.

c. Patient-centred – The patient-centred module had very similar relative differences for the Percentage of patient satisfaction of rooms and clinic cleaning (2), staff satisfaction percentage (3), in-patient satisfaction percentage (4), and out-patient satisfaction percentage (5) ranging from 1.07%-1.35%. The only question that had a higher relative difference was Legal complaint against the hospital within a year (6) with 2.68%.

In the case of accessibility domain, barriers module had 3 (21%) indicators with differences between rounds (table 18). The ability of provider module had 7 (50%) (table 19), and the accessibility to care module had 5 (38%) (table 20).

A list of questions that perfectly correlated between both rounds for this theme is provided for each module (table 21).

a. Barriers – In the Barriers module, we found that Emergency department waiting times by triage category (11) AND Percentage of emergency patients transferred to a ward within 4 hours by triage category (12) had similar relative differences 1.1% and 1.13%. Average length of stay based on different diagnosis (9) had same means for each round but there

were differences in individual answers. These differences ranged from -1 to 1.

b. Ability of provider – In this module, the question with higher relative difference was based on if the provider spend enough time (5) with a 2.7% difference, followed by a tie between Indicator Does provider explain things (3) and Would have gotten better care if different race/ethnicity (8) that had a relative difference of 2.5%.

c. Accessibility to care – For the module denominated accessibility to care, indicator related to % of persons who have a specific source of ongoing care in hospital in each service line (6) was the one with higher relative difference (5.4%) followed % of persons with hospital outpatient department as usual source of care (8) (4.1%) and % of persons with hospital emergency department as usual source of care (9)(3.8%).

d. None of the differences I found were statistically significantly different according to the paired t-tests performed between the two rounds, so no need for extra rounds to reach the targeted threshold of agreement.

Level 2. Selected indicators

The list of final indicators, by different cut-offs of agreement (tables 7-12) of indicators that have a score 4 or 5 as mean score from the two rounds, are presented below, categorised by the modules. It can be observed that choosing the cut-offs of 80% provided abundantly large number of questions in the final list, while choosing 95% had many of the modules with zero questions in the final list. Both the cut-off of 85% and 90% provided reasonable number of questions in the final list. However, for the "Ability of provider" module, using the 90% cut-off yielded zero questions and 85% cut-off will result in a total number of questions of 48 (39%) in

the final list (out of originally 124 questions). 90% as cut-off of agreement was used as a compatible ratio, between experts to give the following list of score between 4 and 5:

Table 6: Selected Indicators(More descriptions in Appendix- table23)

Performance Indicators – Domain: Effectiveness/Quality
I. Clinical Care
1. Percentage of thromboembolism prophylaxis 2. Percentage of laboratory critical values reporting within 30 minutes
II. Patient Safety
3. Percentage of nursing compliance on patient identification during medication preparation and administration 4. Percentage of hand hygiene compliance 5. Percentage of fall rate per 1000 patient-days 6. Blood transfusion reactions rate 7. Hospital acquired infection rate based on ward 8. Hospital acquired infection rate based on procedure 9. Hospital acquired MRSA rate 10. Pressure ulcer incidence rate 11. Number of sentinel events 12. Inappropriate patient surgical site markings 13. Number of adverse drug reactions 14. Central venous catheter-related blood stream infection rate 15. Birth trauma rate
III. Patient-Centred and Coordinated Care
16. Staff satisfaction percentage 17. Inpatient satisfaction percentage
Performance Indicators – Domain: Equity/Accessibility
I. Access to Care
a. Coverage
18. Percentage of persons with health insurance or any other sort of healthcare coverage in the catchment area
b. Usual Source
19. Percentage of persons with hospital emergency department as usual source of care (A mandatory to collaborate with Primary care)
II. Barriers
c. Waiting Time
20. Average outpatient waiting time for their appointment 21. Average length of stay based on different diagnoses 22. Emergency department waiting times by triage category 23. Percentage of patients in ER left before seen (Disposition)

Table 7: Clinical Care (50 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=20 (40%)	N=11 (22%)	N=2 (4%)	N=0 (0%)

Table 8: Patient safety (27 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=25 (93%)	N=18 (67%)	N=13 (48%)	N=8 (30%)

Table 9: Patient centred (6 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=6 (100%)	N=5 (83%)	N=2 (33%)	N=0 (0%)

Table 10: Accessibility to care (13 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=6 (46%)	N=2 (15%)	N=2 (15%)	N=0 (0%)

Table 11: Ability to provider (14 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=8 (57%)	N=4 (27%)	N=0 (0%)	N=0 (0%)

Table 12: Barriers (14 questions)

80% Cut-off	85% Cut-off	90% Cut-off	95% Cut-off
N=8 (57%)	N=4 (27%)	N=4 (29%)	N=0 (0%)

Table 13 - a

Domain: Quality
Clinical Care 1-Readmission rate within 30-days based on diagnosis difference 2-Rate of Aspirin prescribed within 24 hours of arrival for all MI patients 3-Percentage of thromboembolism prophylaxis

4-Percentage of discrepancies between pre- and postoperative diagnosis
5-Percentage of laboratory critical values reporting within 30 minutes
6-Percentage of caesarean deliveries in nulliparous with a term singleton baby in vertex
7-Cesarean delivery rate, uncomplicated
8-Vaginal births after caesarean delivery rate, uncomplicated
9-Percentage of relievers of children inpatient asthma
10-Compliance rate for prophylaxis antibiotics prior to surgeries
11- Percentage of CT scan of brain within 30 minutes of patients with TIA or Stroke
12-Percentage of ECG measured within 10 minutes of arrival
13-Percentage of radiology report turnaround time outliers
14-Esophageal resection volume
15-Pancreatic resection volume
16-Abdominal Aortic Aneurysm repair volume
17-Coronary artery bypass graft volume
18-Carotid endarterectomy volume
19-Laparoscopic cholecystectomy rate
20-Incidental appendectomy in the elderly rate
21-Bilateral cardiac catheterisation rate
22-Percutaneous coronary intervention rate
23-Hysterectomy rate
24-Diabetes, short – term complications admission rate
25-Diabetes, long-term complications admission rate
26-The pure rate of hospital mortality
27-Number of deaths in low mortality diagnostic related groups
28-Esophageal resection mortality rate
29-Pancreatic resection mortality rate
30-Abdominal Aortic Aneurysm repair mortality rate
31-Coronary artery bypass graft (CABG) mortality rate
32-Craniotomy mortality rate
33-Heart failure mortality rate
34-Acute stroke mortality rate
35-Gastrointestinal mortality rate
36-Pneumonia mortality rate
37-Acute myocardial infarction mortality rate
38-Death rate among surgical inpatients with serious treatable conditions
39-Iatrogenic pneumothorax rate
40-Perioperative haemorrhage or hematoma rate
41-Postoperative respiratory failure rate
42-Perioperative pulmonary embolism or deep vein thrombosis rate
43-Postoperative sepsis rate
44-Postoperative wound dehiscence rate
45-Chronic obstructive pulmonary disease or asthma in older adults' admission rate
46-Asthma in younger adults' admission rate
47-Hypertension admission rate
48-Heart failure admission rate
49-Low birth weight admission rate

50-Dehydration admission rate
Patient Safety 1-Percentage of prevention maintenance accomplished as per schedule 2-Percentage of nursing compliance on patient identification during medication preparation and administration 3-Percentage of compliance of handover utilisation process 4-Percentage of awareness of staff to patient culture safety (AHRQ Hospital Survey on Patient Safety Culture) 5-Percentage of hand hygiene compliance 6-Percentage of falls rate per 1000 patient days 7-Blood culture contamination rate 8-Cross match transfusion rate 9-Blood transfusion reaction rate 10-Percentage of completed meal identification card for in-patients 11-Number of Daily Air Removal Test (DART) of steriliser machines 12-Rate of medical waste generation in the hospital 13-Hospital acquired infection rate based on ward 14-Hospital infection rate based on diagnosis 15-Hospital infection rate based on procedure 16-Hospital Acquired MRSA rate 17-Pressure ulcer incidence rate 18-Hospitals accidents prevalence rate 19-Number of sentinel events 20-Inappropriate patient surgical site marking 21-Number of non-drug related near miss 22-Number of drug related near miss 23-Number of adverse drug reaction 24-Rate of Healthcare associated Staphylococcus Aureus bloodstream infections 25-Rate of Healthcare associated Clostridium Difficile infections 26-Central venous catheter related blood stream infection rate 27-Birth trauma rate
Patient-Centred 1-Success in obtaining certificate and accreditations of management quality 2-Percentage of patient satisfaction of rooms and clinic cleaning 3-Staff satisfaction percentage 4-In-Patient satisfaction percentage 5-Out-Patient satisfaction percentage 6-Legal compliant from hospital within one year

Table 13-b

Domain: Equity/Accessibility
Accessibility to Care a-Coverage

1-% of persons with health insurance or any other sort of healthcare coverage in the catchment area
2-% of persons with any private insurance coverage in the catchment area
3-% of persons with only public insurance coverage or other type of governmental coverage visiting the hospital
4-% of persons uninsured all year in the catchment area
5-% of persons with any period of un-insurance during a year
b-Usual Source
6-% of persons who have a specific source of ongoing care in hospital in each service line
7-% of persons in fair or poor health who have a specific source of ongoing care
8-% of persons with hospital outpatient department as usual source of care
9-% of persons with hospital emergency department as usual source of care
c-Un-met Needs
10-% of patients that experience difficulties or delays in obtaining health care or do not receive needed care for himself, or one or more family members
11-Main problem that caused family member's difficulty, delay, or not receiving needed health care
12-% of patients in which a family member did not receive doctor's care or prescription medications because the family needed the money, not insured or delays from payers
13-Satisfied that your family can get health care if they need it

Barriers Within the System
a-Transportation
1-% of persons who complaints about or asked for transportation to get to provider
b-Getting Care
2-Does provider have office hours at night or on weekends?
3-How difficult is it to get appointment with provider on short notice?
4-How difficult is it to contact provider over the telephone or emails about a health problem?
5-How much of a problem was it to get a referral to a specialist that you need to see?
6-How satisfied with professional staff
c-Waiting Time
7-Average inpatients waiting time for bed
8-Average outpatients waiting time for their appointment
9-Average length of stay based on different diagnosis
10-Percentage of patients stayed in ER for more than 6 hours
11-Emergency department waiting times by triage category
12-Percentage of emergency patients transferred to a ward within 4 hours by triage category
13-Average waiting time for elective surgery patient by urgency category
14-Percentage of patients in ER left before seen (Disposition)

Ability of Providers
a-Physician-Patient Communication
1-Does provider generally listen
2-Does provider usually ask about prescription medications and treatments other doctors may give
3-Does provider explain things
4-Does provider show respect for what you had to say
b- Patient-Physician Relationship

5-Provider spend enough time with you 6-Satisfied with quality of care received from provider 7-Are they confident in provider's ability to help when they have a medical problem 8-Would have gotten better care if different race/ethnicity 9-Felt treated with disrespect because of race/ethnicity 10-Doctor understands background and values 11-Very easy to understand prescription bottle 12-Very easy to understand information from doctor's office 13-Very easy to get medical reports 14-Very easy to get tests and radiology results

Tables 14 to 20 shown in appendix discuss each of the domains of care and the related differences between rounds 1 and 2.

Table 21 shown in appendix shows the questions with perfect correlations between round # 1 and round # 2 and table 22 shown in appendix shows the correlation matrix for each of the domains and modules.

3.8 Discussion

As mentioned in the introduction of this chapter, the leaders in healthcare system in Saudi Arabia are adopting new strategies and initiatives to involve the private sectors more in building and operating the governmental hospitals. Through this work, a valid method is being proposed such as Delphi Technique that can be used to have the opinions of one of the main stakeholders including the healthcare professionals and consider the perspectives of quality of care and accessibility as part of the contractual agreement indicators to measure the performance of the private sector. Although Delphi technique is not the only method to reach an agreement between experts but this method gives more opportunities to have interaction with experts and minimise the bias of mixing or changing the experts opinions that normally happen in methods such as, focus group or nominal group model and gives more rational to the agreement results (15). Moreover, the selection criteria for the experts that should be included in the agreement process in a method

like Delphi technique gives more evidence and solid background for the outcomes particularly in areas that require experts' opinion such as quality and accessibility indicators in healthcare sector.

In this work, experts were investigated through Delphi technique to select from a list of indicators which are already valid from valid sources such as, CBAHI, JCI, AHRQ and OECD instead of building new ones from scratch. This ensured minimisation of the risk of time need to measure the validity of the indicators that will be selected or recommended by the experts. However, the number of experts needed for Delphi technique for this work is reasonable at this stage (15) but definitely more sample is needed if more analysis is required. The outcome of the process of selecting indicators in quality and accessibility with 90% agreement between experts is 23 indicators that should be included in the contract between the government and private sector for managing and operating the governmental hospitals. Among these 23, there are 2 in clinical practice, 13 for patient safety, 2 in patient-centred, 2 for coverage and accessibility and 4 for barrier in care. However, the rational of having most of the indicators in safety and barriers is because these are the two main issues with public in healthcare (9,20). Moreover, according to the experts in quality of care, based on their justifications in the interviews the patient safety is the main quality of care challenge the governmental sector was facing from of the public and it needs more focus at this stage.

However, this research can be recognised as a baseline for what should be done and measured for a contractual agreement between the public and private sector. Research is required to be conducted in context of what should be done in future on the basis of identified indicators and these indicators should be revised annually with other indicators, and there should be a flexibility in the contracts to modify, minimise or increase the number of indicators based on the needs and outcome of performance. Also, this list of indicators is merely a recommended list,

which needs to be customised for each project specifically since the gap and demand is different from location to location of the projects and the size of the hospitals. In addition to that, there should be a consideration that the domains of quality and accessibility are the ones that are important for quality experts and health care professionals. However, there are certain other domains and stakeholders which should be included such as, domains related to financial performance, efficiency and administrative indicators which normally in most of the PPPs contracts they are included. Examples of stakeholders who need to be considered as well include, clinical physicians, patients, community representatives, experts in administrations and finance.

For the selected indicators, more work needs to be done to give weights for measurements for the selected ones after measuring their feasibility. Moreover, although the indicators are selected from valid sources with valid definitions, but the validity has to be tested after the first of applying them in the contract to make sure the outcomes of the performance are valid and customised.

3.9 Conclusion

In this study, Delphi method has been proposed to be used for selecting indicators by experts in healthcare for a contractually performance measurement in the PPPs contracts, in order to manage and operate the governmental hospitals. Among the 124 indicators, the experts with 90% agreement selected 23 indicators while confirming they approve the definition of each one of them and accepted the sources of validity of these indicators. However, more research is required to be conducted that includes measuring the feasibility of these indicators which will be done in the third manuscript of this project. Also, the measurement of indicators has to have adjusted weight for each indicator and annual revision process of the validity and the need for customisation

for the selected indicator. Moreover, the method and process for this study is generic, while it can be recommended to repeat the same process for each project to make sure the selected indicators are more specific.

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CHAPTER FOUR

4.1 Introduction

In this manuscript, the work was done to ensure that the recommended list of the indicators by experts are practically acceptable. Although, selecting the index of performance indicators by a valid method such as the Delphi technique and from validated sources might not be enough to effectively use the performance indicators. So, even if the indicators were selected by experts in the field, the need to understand and measure the feasibility of using these indicators is important to make sure the indicators are usable.

The aim is 'to test the performance indicators that were selected by the experts in the second manuscript by using a pilot study to evaluate the feasibility of the selected indicators which include the availability of valid and consistence sources of data to measure and apply the indicators.'

4.2 Methodology

4.2.1 Design and setting

In this paper, a pilot study was conducted of four hospital that were randomly selected by the researcher selected from a group of hospitals the Ministry of Health listed as potential hospitals for performance measurement initiative and privatisation. The list of the Ministry of Health hospitals contains 23 secondary hospital from different regions. The random selection from this list was conducted by the researcher. The study is retrospective and cross-sectional study to apply the selected indicators from the Second manuscript to evaluate the feasibility of using the selected indicators to measure the performance of the secondary care hospitals when they are managed by private sector. The feasibility in this setting will be defined as "the availability of reliable, valid, and consistent sources of data across the secondary care hospitals" (1). The measurement was

evaluated by a survey distributed to the quality directors in four major secondary care hospitals in Dammam, Jazan, Mecca and Arar. The survey has a yes or no response for each indicator (2) for each of the following six dimensions with equal weight.

Acceptability means **-** The level of acceptability of indicator X and who will be undertaking the assessment are determined. For example, of acceptability, if the department or service related to the recommended indicator are available.

Data availability means **-** The data sources available, valid and consistent to be collected to measure the indicator.

Reliability means - The errors are at their most minimal level when measured and the findings are consistent so if repeated, they will give the same results.

Sensitivity means - The indicator X capture change in the component that was measured and reflect that in the result. Where the indicator should detect changes in the measurement process and reflect that on the outputs and results.

Specificity means - Indicator X is able to capture changes that happened only in the particular service that was intended to be measured and reflect that on the result.

Resources **-** The availability of at least Health Information System and dedicated personal to collect data for performance indicators measurement.

Follow-up calls were made for all the four quality directors to double check if they understood the definitions of each feasibility criteria and all of them confirmed and based on their background and experiences, they had achieved full understanding of each definition. The four directors of quality in the four hospitals had at least experience of five years in healthcare sector and hospital management with the following qualifications: two of them were medical board

holding certificates in quality and the other two were masters in hospital administration and quality.

4.3 Analysis Plan

Each indicator had a score based on number of agreements of having the data validity. After that, the average score was calculated to understand the feasibility of measuring the indicator as it is shown in table-23.

Table 14: Feasibility Score

DOMAIN		INDICATOR	Feasibility				
			Mecca	Jazan	Dammam	Arar	Feasibility
Effectiveness\Quality	Clincal Care	% of Thromb. Prophylaxis	100.00%	66.67%	100.00%	100.00%	92%
	Clinical Care	% of laboratory critical values reporting within 30 min.	100.00%	100.00%	100.00%	100.00%	100%
	Patient Safety	% of nursing compliance on pt. identification during medication prep. and admin.	50.00%	66.67%	0.00%	50.00%	42%
	Patient Safety	% of hand hygine	83.33%	66.67%	100.00%	100.00%	88%
	Patient Safety	% of falls rate per 1000 pts days	100.00%	83.33%	100.00%	100.00%	96%
	Patient Safety	Blood transfusion reac. rate	100.00%	66.67%	83.33%	100.00%	88%
	Patient Safety	Hospital acquired inf. rate based on ward	100.00%	66.67%	100.00%	100.00%	92%
	Patient Safety	Hospital acquired inf. rate based on procedure	100.00%	66.67%	100.00%	100.00%	92%
	Patient Safety	Hospital acquired MRSA	100.00%	66.67%	100.00%	100.00%	92%
	Patient Safety	Pressure ulcer incident rate	100.00%	100.00%	100.00%	100.00%	100%
	Patient Safety	Number of sentinal events	100.00%	100.00%	100.00%	100.00%	100%
	Patient Safety	Inapp. Pt. surgical site marking	66.67%	66.67%	100.00%	16.67%	63%
	Patient Safety	Number of adverse drug reaction	100.00%	66.67%	100.00%	100.00%	92%
	Patient Safety	Central venous cath. related blood stream infection rate	100.00%	66.67%	100.00%	100.00%	92%
	Patient Safety	Birth trauma rate	100.00%	66.67%	16.67%	100.00%	71%
	Pt. Ctr. & Coord. Care	%Staff satisfaction	83.33%	66.67%	100.00%	100.00%	88%
	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	83.33%	66.67%	100.00%	100.00%	88%
Accessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	83.33%	100.00%	83.33%	83.33%	87%
	Access to care:Usual source	% of persons with hospital emergency as usual source of care	100.00%	83.33%	100.00%	100.00%	96%
	Waiting time	Average out-patients waiting time for their appointments	83.33%	100.00%	100.00%	100.00%	96%
	Waiting time	Average length of stay based on diagnosis	100.00%	66.67%	100.00%	100.00%	92%
	Waiting time	Emergency department waiting times by triage category	100.00%	83.33%	100.00%	100.00%	96%
	Waiting time	% of patients in ER left before seen (Disposition)	83.33%	66.67%	100.00%	100.00%	88%

Table 15: Feasibility Score

Feasibility %	83.33-100
	66.66-83.33
	<66.66

However, for prioritising the process of selecting the indicators, one step further was taken by using Golden Standards measurement and measure the discrepancy. Mecca's feasibility on the 23 indicators was used as the gold standard for assessing the performance of the other three hospitals (Jazan, Dammam, and Arar) because it is the most funded and most advanced hospital among the others. To identify which indicator(s) reflect the biggest discrepancy comparing the three hospitals to the gold standard hospital, square root of feasibility variance as the discrepancy indicator was calculated. The following equation was developed and used in this analysis (n=3, corresponding to the three other hospitals):

$$\text{Feasibility discrepancy } \sigma = \sqrt{\frac{\sum_1^n (Feasibility_i - Feasibility_{GS})^2}{n}} \quad (1)$$

GS: gold standard: which is a measurement method by using a benchmarking reference for comparisons as the best available reference under reasonable condition.

Different from calculating the hospital feasibility variance, the statistics of feasibility discrepancy better reflects the overall disagreement of the non-gold standard hospitals to the gold standard hospitals in each indicator. Based on the discrepancy statistics, heat map was used (green represents small discrepancy and red represents big discrepancy) to highlight the indicators that carry the maximum disagreement to the gold standard.

4.4 Results

Regarding the feasibility, all the indicators are feasible to measure except three indicators in the domain of patient safety with scores lower than 83.3 in the four hospitals. The three indicators are:

- Percentage of nursing compliance on pt. identification during medication preparation and administration
- Percentage of inappropriate patient surgical site marking
- Birth trauma rate

Mostly, these three indicators have the lowest feasibility because of the data availability and resources to measure them. Moreover, the quality directors have some concerns about the reliability of using these indicators. The feasibility scores are analysed as following:

The discrepancy analysis (heat map) shows that 3 out of the 23 indicators have no discrepancy ($\sigma = 0$); 4 indicators have slight discrepancy ($0 < \sigma \leq 0.1$); 13 indicators have mild to median discrepancy ($0.1 < \sigma \leq 0.3$) ; and 3 indicators have strong to severe discrepancy ($\sigma > 0.5$) (Table-24). The top three indicators with biggest discrepancy are birth trauma rate ($\sigma = 0.52$), inappropriate patients surgical site making ($\sigma = 0.35$), and percent of nursing compliance on patient identification during medical preparation and administration ($\sigma = 0.30$). However, further analyses are needed to discover what aspects are driving the feasibility discrepancy in the above indicators.

Table 16: Indicators Discrepancies' Scores

Table a. KPI for medical centers, arranged by domins

Domin 1	Domin 2	Indicators	Feasibility				Performance Discrepancy
			Mecca (GS)	Jazan	Dammam	Arar	
Effectiveness/quality	Clincal Care	% of Thromb. Prophylaxis	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Clinical Care	% of laboratory critical values reporting within 30 min.	100.00%	100.00%	100.00%	100.00%	0.0000
Effectiveness/quality	Patient Safety	% of nursing compliance on pt. identification during medication prep. and adm	50.00%	66.67%	0.00%	50.00%	0.3043
Effectiveness/quality	Patient Safety	% of hand hygine	83.33%	66.67%	100.00%	100.00%	0.1667
Effectiveness/quality	Patient Safety	% of falls rate per 1000 pts days	100.00%	83.33%	100.00%	100.00%	0.0962
Effectiveness/quality	Patient Safety	Blood transfusion reac. rate	100.00%	66.67%	83.33%	100.00%	0.2152
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on ward	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on procedure	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Hospital acquired MRSA	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Pressure ulcer incident rate	100.00%	100.00%	100.00%	100.00%	0.0000
Effectiveness/quality	Patient Safety	Number of sentinal events	100.00%	100.00%	100.00%	100.00%	0.0000
Effectiveness/quality	Patient Safety	Inapp. Pt. surgical site marking	66.67%	66.67%	100.00%	16.67%	0.3469
Effectiveness/quality	Patient Safety	Number of adverse drug reaction	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Central venous cath. related blood stream infection rate	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Birth trauma rate	100.00%	66.67%	16.67%	100.00%	0.5182
Effectiveness/quality	Pt. Ctr. & Coord. Care	%Staff satisfaction	83.33%	66.67%	100.00%	100.00%	0.1667
Effectiveness/quality	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	83.33%	66.67%	100.00%	100.00%	0.1667
Acessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	83.33%	100.00%	83.33%	83.33%	0.0962
Acessibility	Access to care:Usual source	% of persons with hospital emergency as usual source of care	100.00%	83.33%	100.00%	100.00%	0.0962
Acessibility	Waiting time	Average out-patients waiting time for their appointments	83.33%	100.00%	100.00%	100.00%	0.1667
Acessibility	Waiting time	Average length of stay based on diagnosis	100.00%	66.67%	100.00%	100.00%	0.1924
Acessibility	Waiting time	Emergency department waiting times by triage category	100.00%	83.33%	100.00%	100.00%	0.0962
Acessibility	Waiting time	% of patients in ER left before seen (Disposition)	83.33%	66.67%	100.00%	100.00%	0.1667

Color scale	
0	No Discrepancy
0.1	Slight Discrepancy
0.2	Mild Discrepancy
0.3	Medium Discrepancy
0.4	Strong Discrepancy
0.5	Severe Discrepancy

Table b. KPI for medical centers, arrange by performance Discrepancy

Domin 1	Domin 2	Indicators	Feasibility				Performance Discrepancy
			Mecca (GS)	Jazan	Dammam	Arar	
Effectiveness/quality	Patient Safety	Birth trauma rate	100.00%	66.67%	16.67%	100.00%	0.5182
Effectiveness/quality	Patient Safety	Inapp. Pt. surgical site marking	66.67%	66.67%	100.00%	16.67%	0.3469
Effectiveness/quality	Patient Safety	% of nursing compliance on pt. identification during medication prep. and adm	50.00%	66.67%	0.00%	50.00%	0.3043
Effectiveness/quality	Patient Safety	Blood transfusion reac. rate	100.00%	66.67%	83.33%	100.00%	0.2152
Effectiveness/quality	Clincal Care	% of Thromb. Prophylaxis	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on ward	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on procedure	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Hospital acquired MRSA	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Number of adverse drug reaction	100.00%	66.67%	100.00%	100.00%	0.1924
Effectiveness/quality	Patient Safety	Central venous cath. related blood stream infection rate	100.00%	66.67%	100.00%	100.00%	0.1924
Acessibility	Waiting time	Average length of stay based on diagnosis	100.00%	66.67%	100.00%	100.00%	0.1924
Acessibility	Waiting time	Average out-patients waiting time for their appointments	83.33%	100.00%	100.00%	100.00%	0.1667
Effectiveness/quality	Patient Safety	% of hand hygine	83.33%	66.67%	100.00%	100.00%	0.1667
Effectiveness/quality	Pt. Ctr. & Coord. Care	%Staff satisfaction	83.33%	66.67%	100.00%	100.00%	0.1667
Effectiveness/quality	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	83.33%	66.67%	100.00%	100.00%	0.1667
Acessibility	Waiting time	% of patients in ER left before seen (Disposition)	83.33%	66.67%	100.00%	100.00%	0.1667
Effectiveness/quality	Patient Safety	% of falls rate per 1000 pts days	100.00%	83.33%	100.00%	100.00%	0.0962
Acessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	83.33%	100.00%	83.33%	83.33%	0.0962
Acessibility	Access to care:Usual source	% of persons with hospital emergency as usual source of care	100.00%	83.33%	100.00%	100.00%	0.0962
Acessibility	Waiting time	Emergency department waiting times by triage category	100.00%	83.33%	100.00%	100.00%	0.0962
Effectiveness/quality	Clinical Care	% of laboratory critical values reporting within 30 min.	100.00%	100.00%	100.00%	100.00%	0.0000
Effectiveness/quality	Patient Safety	Pressure ulcer incident rate	100.00%	100.00%	100.00%	100.00%	0.0000
Effectiveness/quality	Patient Safety	Number of sentinal events	100.00%	100.00%	100.00%	100.00%	0.0000

Table 17: Alnoor Hospital in Mecca

FEASIBILITY	YES	NO	entry validation
Acceptability	23	0	23
Data availability	21	2	23
Reliability	20	3	23
Sensitivity	22	1	23
Specificity	19	4	23
Resources	22	1	23

Feasibility %	
	83.33-100
	66.66-83.33
	<66.66

REGION	Jazan		Hospital	King Fahad Hospita					
DOMAIN	INDICATOR	Feasibility							
		Acceptability	Data availability	Reliability	Sensitivity	Specificity	Resources	Feasibility %
Effectiveness\Quality	Clincal Care	% of Thromb. Prophylaxis	yes	yes	yes	yes	yes	yes	100.00%
	Clinical Care	% of laboratory critical values reporting within 30 min.	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of nursing compliance on pt. identification during medication prep. and admin.	yes	no	no	yes	yes	no	50.00%
	Patient Safety	% of hand hygine	yes	yes	yes	yes	no	yes	83.33%
	Patient Safety	% of falls rate per 1000 pts days	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Blood transfusion reac. rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired inf. rate based on ward	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired inf. rate based on procedure	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired MRSA	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Pressure ulcer incident rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Number of sentinal events	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Inapp. Pt. surgical site marking	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Number of adverse drug reaction	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Central venous cath. related blood stream infection rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Birth trauma rate	yes	yes	yes	yes	yes	yes	100.00%
	Pt. Ctr. & Coord. Care	%Staff satisfaction	yes	yes	no	yes	yes	yes	83.33%
	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	yes	yes	yes	yes	no	yes	83.33%
Accessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	yes	no	yes	yes	yes	yes	83.33%
	Access to care:Usual source	% of persons with hospital emergency as usual source of care	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average out-patients waiting time for their appointments	yes	yes	yes	yes	no	yes	83.33%
	Waiting time	Average length of stay based on diagnosis	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Emergency department waiting times by triage category	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	% of patients in ER left before seen (Disposition)	yes	yes	yes	yes	no	yes	83.33%

Table 18: Arar Hospital

FEASIBILITY	YES	NO	entry validation
Acceptability	23	0	23
Data availability	20	3	23
Reliability	21	2	23
Sensitivity	22	1	23
Specificity	22	1	23
Resources	21	2	23

Feasibility %	
	83.33-100
	66.66-83.33
	<66.66

REGION **Hospital**

DOMAIN		INDICATOR	Feasibility						
			Acceptability	Data availability	Reliability	Sensitivity	Specificity	Resources	Feasibility %
Effectiveness\Quality	Clincal Care	% of Thromb. Prophylaxis	yes	yes	yes	yes	yes	yes	100.00%
	Clinical Care	% of laboratory critical values reporting within 30 min.	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of nursing compliance on pt. identification during medication prep. and admin.	yes	no	no	yes	yes	no	50.00%
	Patient Safety	% of hand hygine	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of falls rate per 1000 pts days	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Blood transfusion reac. rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired inf. rate based on ward	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired inf. rate based on procedure	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired MRSA	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Pressure ulcer incident rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Number of sentinal events	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Inapp. Pt. surgical site marking	yes	no	no	no	no	no	16.67%
	Patient Safety	Number of adverse drug reaction	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Central venous cath. related blood stream infection rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Birth trauma rate	yes	yes	yes	yes	yes	yes	100.00%
	Pt. Ctr. & Coord. Care	%Staff satisfaction	yes	yes	yes	yes	yes	yes	100.00%
	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	yes	yes	yes	yes	yes	yes	100.00%
Accessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	yes	no	yes	yes	yes	yes	83.33%
	Access to care:Usual source	% of persons with hospital emergency as usual source of care	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average out-patients waiting time for their appointments	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average length of stay based on diagnosis	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Emergency department waiting times by triage category	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	% of patients in ER left before seen (Disposition)	yes	yes	yes	yes	yes	yes	100.00%

Table 19: Dammam Central Hospital

FEASIBILITY	YES	NO	entry validation
Acceptability	22	1	23
Data availability	19	4	23
Reliability	21	2	23
Sensitivity	21	2	23
Specificity	21	2	23
Resources	21	2	23

Feasibility %	
	83.33-100
	66.66-83.33
	<66.66

REGION	Jazan	Hospital	King Fahad Hospita

DOMAIN		INDICATOR	Feasibility						
			Acceptability	Data availability	Reliability	Sensitivity	Specificity	Resources	Feasibility %
Effectiveness\Quality	Clincal Care	% of Thromb. Prophylaxis	yes	yes	yes	yes	yes	yes	100.00%
	Clinical Care	% of laboratory critical values reporting within 30 min.	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of nursing compliance on pt. identification during medication prep. and admin.	no	no	no	no	no	no	0.00%
	Patient Safety	% of hand hygine	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of falls rate per 1000 pts days	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Blood transfusion reac. rate	yes	no	yes	yes	yes	yes	83.33%
	Patient Safety	Hospital acquired inf. rate based on ward	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired inf. rate based on procedure	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Hospital acquired MRSA	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Pressure ulcer incident rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Number of sentinal events	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Inapp. Pt. surgical site marking	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Number of adverse drug reaction	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Central venous cath. related blood stream infection rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Birth trauma rate	yes	no	no	no	no	no	16.67%
	Pt. Ctr. & Coord. Care	%Staff satisfaction	yes	yes	yes	yes	yes	yes	100.00%
	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	yes	yes	yes	yes	yes	yes	100.00%
Accessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	yes	no	yes	yes	yes	yes	83.33%
	Access to care:Usual source	% of persons with hospital emergency as usual source of care	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average out-patients waiting time for their appointments	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average length of stay based on diagnosis	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Emergency department waiting times by triage category	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	% of patients in ER left before seen (Disposition)	yes	yes	yes	yes	yes	yes	100.00%

Table 20: King Fahad Hospital-Jazan

FEASIBILITY	YES	NO	entry validation
Acceptability	23	0	23
Data availability	23	0	23
Reliability	6	17	23
Sensitivity	7	16	23
Specificity	23	0	23
Resources	23	0	23

Feasibility %	
	83.33-100
	66.66-83.33
	<66.66

REGION	Jazan		Hospital	King Fahad Hospita						
DOMAIN		INDICATOR	Feasibility							
			Acceptability	Data availability	Reliability	Sensitivity	Specificity	Resources	Feasibility %
Effectiveness\Quality	Clincal Care	% of Thromb. Prophylaxis	yes	yes	no	no	yes	yes	66.67%
	Clinical Care	% of laboratory critical values reporting within 30 min.	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	% of nursing compliance on pt. identification during medication prep. and admin.	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	% of hand hygine	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	% of falls rate per 1000 pts days	yes	yes	no	yes	yes	yes	83.33%
	Patient Safety	Blood transfusion reac. rate	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Hospital acquired inf. rate based on ward	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Hospital acquired inf. rate based on procedure	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Hospital acquired MRSA	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Pressure ulcer incident rate	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Number of sentinal events	yes	yes	yes	yes	yes	yes	100.00%
	Patient Safety	Inapp. Pt. surgical site marking	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Number of adverse drug reaction	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Central venous cath. related blood stream infection rate	yes	yes	no	no	yes	yes	66.67%
	Patient Safety	Birth trauma rate	yes	yes	no	no	yes	yes	66.67%
	Pt. Ctr. & Coord. Care	%Staff satisfaction	yes	yes	no	no	yes	yes	66.67%
	Pt. Ctr. & Coord. Care	%of inpatient satsifaction	yes	yes	no	no	yes	yes	66.67%
Accessibility	Access to care:Coverage	% of persons with health insurance or any other coverage	yes	yes	yes	yes	yes	yes	100.00%
	Access to care:Usual source	% of persons with hospital emergency as usual source of care	yes	yes	no	yes	yes	yes	83.33%
	Waiting time	Average out-patients waiting time for their appointments	yes	yes	yes	yes	yes	yes	100.00%
	Waiting time	Average length of stay based on diagnosis	yes	yes	no	no	yes	yes	66.67%
	Waiting time	Emergency department waiting times by triage category	yes	yes	yes	no	yes	yes	83.33%
	Waiting time	% of patients in ER left before seen (Disposition)	yes	yes	no	no	yes	yes	66.67%

4.5 Discussion

After selecting the indicators in the first two manuscripts by the experts, it was important to understand the practicality of using them as indicators to measure the success of partnerships between the private and public sectors contractually from the healthcare experts' perspective. Measuring the feasibility was important in the process of selecting the indicators and detecting

discrepancies between the hospitals to have practical list of indicators. At this stage, the final list of the selected indicators includes the indicators that are recommended by the experts, with high feasibility scores and mild to no discrepancies among the hospitals in the pilot. The list of selected indicators is shown in the table 29 below:

Table 21: Selected Indicators

Effectiveness/quality	Patient Safety	Blood transfusion reac. rate
Effectiveness/quality	Clinical Care	% of Thromb. Prophylaxis
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on ward
Effectiveness/quality	Patient Safety	Hospital acquired inf. rate based on procedure
Effectiveness/quality	Patient Safety	Hospital acquired MRSA
Effectiveness/quality	Patient Safety	Number of adverse drug reaction
Effectiveness/quality	Patient Safety	Central venous cath. related blood stream infection rate
Accessibility	Waiting time	Average length of stay based on diagnosis
Accessibility	Waiting time	Average out-patients waiting time for their appointments
Effectiveness/quality	Patient Safety	% of hand hygiene
Effectiveness/quality	Pt. Ctr. & Coord. Care	%Staff satisfaction
Effectiveness/quality	Pt. Ctr. & Coord. Care	%of inpatient satisfaction
Accessibility	Waiting time	% of patients in ER left before seen (Disposition)
Effectiveness/quality	Patient Safety	% of falls rate per 1000 pts days
Accessibility	Access to care: Coverage	% of persons with health insurance or any other coverage
Accessibility	Access to care: Usual source	% of persons with hospital emergency as usual source of care
Accessibility	Waiting time	Emergency department waiting times by triage category
Effectiveness/quality	Clinical Care	% of laboratory critical values reporting within 30 min.

Effectiveness/quality	Patient Safety	Pressure ulcer incident rate
Effectiveness/quality	Patient Safety	Number of sentinel events

Although, the evaluation of the feasibility of measuring the selected indicators was done by experts in the field, it might be more practical if the pilot was done by running a process of collecting the data and testing them. However, the main goal of this project is to propose a process of selecting indicators that should be embedded within the contractual agreement of PPPs projects.

4.6 Conclusion

The quality directors in four of the Ministry of Health lists of hospitals in four different cities, evaluated the feasibility of measuring the twenty-three selected indicators by experts in healthcare system that should be used to evaluate the quality and accessibility of the hospitals embedded with management systems such as PPPs. Three of the twenty-three indicators were having lowest average scores among the four hospitals with highest discrepancies among the pilot hospitals which are birth trauma rate, % of nursing compliance on patient identification during medication preparation and inappropriate surgical site marking on patients. In the final list, twenty indicators were included that should be embedded in the PPPs contract.

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CHAPTER FIVE

5.1 Implications for Practice and Policy

The study conducted in this dissertation helps in approaching PPP projects in healthcare from different perspectives. Specifically, this project has considered the perspective of embedding professionals' opinions in what should be monitored and measured when dealing occurs between the private and government sectors. The main objective was to identify the kind of measurable quality and accessibility indicators that should be the part of PPP contracts. Normally, such contracts include terms that are related to financials and infrastructure deliverables and maintenance. Through this study, researcher aimed to suggest measures to improve services delivery in two vital domains for measuring performance, quality and accessibility. Moreover, the work in this project attempted to propose the right method for considering professional opinions as input to help monitor private-sector performance, when they have a deal with the private sector in managing and operating secondary care hospitals.

5.1.1 Practice

The probable approach in this project being needed is potentially high due to the trend in Saudi Arabia of privatising all healthcare sectors as part of what the government is planning to achieve with Vision 2030. One big initiative in Vision 2030 is to privatise all healthcare sectors and shift the management of the infrastructure to the private sector. PPPs are one of the tools the government is adopting. However, monitoring the quality and accessibility as part of contracting the private sector by considering professional opinions in this matter is very critical.

In the first paper, the work gives decision-makers an overview of the historical relationship between the private sector in healthcare and the governmental sector. This can facilitate decision-

makers in enabling them to understand the traditional and historical relationship between the two sectors regarding healthcare.

In the second paper, using the Delphi technique to select performance indicators for PPP contracts for secondary care hospitals served as a trial to propose the ultimate method that should be used to include the perspectives of one of the most important stakeholders (the healthcare professionals) when identifying what should be evaluated and measured—especially for domains such as quality and accessibility. The result from the selection process can be proposed as a feasible set of indicators in the quality and accessibility domains. Further, these indicators can be recommended for inclusion in contracts as part of measuring the success of privatising and establishing PPP projects in secondary care hospitals in Saudi Arabia.

In the third paper, there was a pilot in four hospitals in different regions—Dammam, Mecca, Arar, and Jazan—to measure the feasibility. These pilots were vital for identifying the resources needed to measure the selected indicators that must be recommended for contractual agreements between the two sectors.

Further research needs to be conducted at many levels. First, additional work needs to be done to measure the applicability of the selected indicators and to monitor their impacts in such projects in order to modify and customise them. Consequently, there will be more in-depth analysis after implementing the indicators, including on their generalisability. The second issue that needs to be focused is the type of facility. Additional research is required to be conducted to select indicators for primary care and tertiary care, depending on whether the setup involves hospitals or healthcare centres. More specifically, such studies must also explore indicators for the PPPs or privatisation for specific services, such as radiology or labs.

However, a project-based approach rather than a more generalised one must be undertaken to conduct this type or research, as each healthcare organisation and situation is unique. Namely, in healthcare, there are many different factors that require different considerations, investments, resources, and customisations; particularly in case of quality and accessibility.

5.1.2 Policy

At the level of the Ministry of Health or any other governmental entities planning to privatise or establish a partnership with the private sector, this study can help with creating a policy to identify strategies on how to involve professional stakeholders and to select the indicators that should be measured in the contractual agreement for managing and operating healthcare facilities. This work provides a recommended method and process to select indicators in domains related to the quality and effectiveness of offering healthcare services, particularly from the professional perspective, which is not usually considered in such deals. Most PPPs, privatisation arrangements and contracts focus mainly on financials and infrastructure maintenance, with insufficient focus on performance measurements in the contractual element.

The research conducted in this study is in-progress with respect to recommending a set of indicators that can be feasibly measured and included in contracts and agreements in order to measure the success of PPPs and other arrangements. However, a policy mandate would be necessary to utilise this approach in every project between the government and the private sector.

APPENDIX

List OF PIS

Table 13-a

Domain: Quality
Clinical Care
1-Readmission rate within 30-days based on diagnosis difference
2-Rate of Aspirin prescribed within 24 hours of arrival for all MI patients
3-Percentage of thromboembolism prophylaxis
4-Percentage of discrepancies between pre- and postoperative diagnosis
5-Percentage of laboratory critical values reporting within 30 minutes
6-Percentage of caesarean deliveries in nulliparous with a term singleton baby in vertex
7-Cesarean delivery rate, uncomplicated
8-Vaginal births after caesarean delivery rate, uncomplicated
9-Percentage of relievers of children inpatient asthma
10-Compliance rate for prophylaxis antibiotics prior to surgeries
11- Percentage of CT scan of brain within 30 minutes of patients with TIA or Stroke
12-Percentage of ECG measured within 10 minutes of arrival
13-Percentage of radiology report turnaround time outliers
14-Esophageal resection volume
15-Pancreatic resection volume
16-Abdominal Aortic Aneurysm repair volume
17-Coronary artery bypass graft volume
18-Carotid endarterectomy volume
19-Laparoscopic cholecystectomy rate
20-Incidental appendectomy in the elderly rate
21-Bilateral cardiac catheterisation rate
22-Percutaneous coronary intervention rate
23-Hysterectomy rate
24-Diabetes, short – term complications admission rate
25-Diabetes, long-term complications admission rate
26-The pure rate of hospital mortality
27-Number of deaths in low mortality diagnostic related groups
28-Esophageal resection mortality rate
29-Pancreatic resection mortality rate
30-Abdominal Aortic Aneurysm repair mortality rate
31-Coronary artery bypass graft (CABG) mortality rate
32-Craniotomy mortality rate
33-Heart failure mortality rate
34-Acute stroke mortality rate
35-Gastrointestinal mortality rate
36-Pneumonia mortality rate
37-Acute myocardial infarction mortality rate
38-Death rate among surgical inpatients with serious treatable conditions

39-Iatrogenic pneumothorax rate
40-Perioperative haemorrhage or hematoma rate
41-Postoperative respiratory failure rate
42-Perioperative pulmonary embolism or deep vein thrombosis rate
43-Postoperative sepsis rate
44-Postoperative wound dehiscence rate
45-Chronic obstructive pulmonary disease or asthma in older adults' admission rate
46-Asthma in younger adults' admission rate
47-Hypertension admission rate
48-Heart failure admission rate
49-Low birth weight admission rate
50-Dehydration admission rate

Patient Safety

1-Percentage of prevention maintenance accomplished as per schedule
2-Percentage of nursing compliance on patient identification during medication preparation and administration
3-Percentage of compliance of handover utilisation process
4-Percentage of awareness of staff to patient culture safety (AHRQ Hospital Survey on Patient Safety Culture)
5-Percentage of hand hygiene compliance
6-Percentage of falls rate per 1000 patient days
7-Blood culture contamination rate
8-Cross match transfusion rate
9-Blood transfusion reaction rate
10-Percentage of completed meal identification card for in-patients
11-Number of Daily Air Removal Test (DART) of steriliser machines
12-Rate of medical waste generation in the hospital
13-Hospital acquired infection rate based on ward
14-Hospital infection rate based on diagnosis
15-Hospital infection rate based on procedure
16-Hospital Acquired MRSA rate
17-Pressure ulcer incidence rate
18-Hospitals accidents prevalence rate
19-Number of sentinel events
20-Inappropriate patient surgical site marking
21-Number of non-drug related near miss
22-Number of drug related near miss
23-Number of adverse drug reaction
24-Rate of Healthcare associated Staphylococcus Aureus bloodstream infections
25-Rate of Healthcare associated Clostridium Difficile infections
26-Central venous catheter related blood stream infection rate
27-Birth trauma rate

Patient-Centred

1-Success in obtaining certificate and accreditations of management quality
2-Percentage of patient satisfaction of rooms and clinic cleaning
3-Staff satisfaction percentage

4-In-Patient satisfaction percentage 5-Out-Patient satisfaction percentage 6-Legal compliant from hospital within one year

Table 13-b

Domain: Equity/Accessibility
Accessibility to Care a-Coverage 1-% of persons with health insurance or any other sort of healthcare coverage in the catchment area 2-% of persons with any private insurance coverage in the catchment area 3-% of persons with only public insurance coverage or other type of governmental coverage visiting the hospital 4-% of persons uninsured all year in the catchment area 5-% of persons with any period of un-insurance during a year b-Usual Source 6-% of persons who have a specific source of ongoing care in hospital in each service line 7-% of persons in fair or poor health who have a specific source of ongoing care 8-% of persons with hospital outpatient department as usual source of care 9-% of persons with hospital emergency department as usual source of care c-Un-met Needs 10-% of patients that experience difficulties or delays in obtaining health care or do not receive needed care for himself, or one or more family members 11-Main problem that caused family member's difficulty, delay, or not receiving needed health care 12-% of patients in which a family member did not receive doctor's care or prescription medications because the family needed the money, not insured or delays from payers 13-Satisfied that your family can get health care if they need it
Barriers Within the System a-Transportation 1-% of persons who complaints about or asked for transportation to get to provider b-Getting Care 2-Does provider have office hours at night or on weekends? 3-How difficult is it to get appointment with provider on short notice? 4-How difficult is it to contact provider over the telephone or emails about a health problem? 5-How much of a problem was it to get a referral to a specialist that you need to see? 6-How satisfied with professional staff c-Waiting Time 7-Average inpatients waiting time for bed 8-Average outpatients waiting time for their appointment 9-Average length of stay based on different diagnosis 10-Percentage of patients stayed in ER for more than 6 hours 11-Emergency department waiting times by triage category

12-Percentage of emergency patients transferred to a ward within 4 hours by triage category 13-Average waiting time for elective surgery patient by urgency category 14-Percentage of patients in ER left before seen (Disposition)
Ability of Providers a-Physician-Patient Communication 1-Does provider generally listen 2-Does provider usually ask about prescription medications and treatments other doctors may give 3-Does provider explain things 4-Does provider show respect for what you had to say b- Patient-Physician Relationship 5-Provider spend enough time with you 6-Satisfied with quality of care received from provider 7-Are they confident in provider's ability to help when they have a medical problem 8-Would have gotten better care if different race/ethnicity 9-Felt treated with disrespect because of race/ethnicity 10-Doctor understands background and values 11-Very easy to understand prescription bottle 12-Very easy to understand information from doctor's office 13-Very easy to get medical reports 14-Very easy to get tests and radiology results

Figure 3: Sample of Round-1 Survey:

Selection Performance Indicators for PPPs in Healthcare

Thank you for participating in this research where we are identifying the performance indicators of public-private partnerships and privatization activities in health care projects in Saudi Arabia. In this exercise, we will use Delphi method to determine how the experts in health care system in Saudi system identify the performance indicators and prioritize them to measure the impacts of privatizing health care services in Saudi Arabia. In this study, the focus will be toward the performance indicators for privatization and public-private partnerships projects in secondary and tertiary care hospitals. This study is being conducted by a team include a doctorate students and research assistance from Johns Hopkins University, United States and University of Dammam , Saudi Arabia in collaboration with Saudi Central Board for Accreditation of Healthcare Institutions CBAHI. By using Delphi exercise we anticipate to have an interactive and enlightening process between the expert participants. However, we understand dealing with a broad topic and domains related to performance indicators can be associated with a degree of uncertainty and debatable issues, so we would encourage that you supply the best estimate based on your experience. For this purpose, we have selected expert participants with variety of backgrounds so you shouldn't be concerned if you are comfortable to answer some questions more than others. All what we expect is to have you answer each question to the best of your ability. Also, we would like to remind you all the answers will be anonymously analyzed and entered.

The following are important definitions and terms as reference in the exercise:

Public-Private Partnerships (PPPs) and Privatization: "Refers to arrangements where the private sector supplies infrastructure and/or services that traditionally have been provided by the Government"

Performance Indicators: The performance indicators are defined as s "measurable elements of practice performance for which there is evidence or consensus that they can be used to assess the quality, and hence change of quality, of care provided"

Structure: This category is related to the resources of health care systems that need to be utilized or giving the ability to achieve targets or meet health care needs. This should include buildings, equipment, available financing, and available human capital such specialists, nurses, and physicians.
Process: This category is for the indicators that measure the related activities. One example is compliance with recommended practice, meaning what was actually done for the users and how well the services were performed. The main advantages of using the process indicators are that they are the best for quality improvement feedback, since they are under the control of a manager, clinicians, or other providers where this kind of control can encourage some accountability for the results. Also, the results from this type of indicator could show what can be done better, and they are on a more reasonable timeline to be collected. However, these indicators have some disadvantages. The main one is that they rely on assumptions linked to specific outcomes, and this creates a very narrow focus on specific interventions and conditions. Also, they don't show how effective the process was when it was completed.
Outcome: This category of indicators is related to results of individuals or population interactions and utilization of health care systems. These results are varied and can be related to mortality and morbidity rates, an increase level of awareness and satisfaction, a change in lifestyle, and alteration in the level of pain, such as with emotional responses and other types of outcomes.

One integral element to the Delphi Method is to provide explanations / justifications for your choices. These can be short (one or two brief bullet points) or long (a detailed explanation listing various causal variables), depending on your preference, but the comments should be sufficient to allow any reader to understand how you made your estimate and what assumptions were involved. We therefore ask that—unless otherwise stated—you supply at least some explanation for every comment field in the questionnaire.
The questionnaire will have a quantitative section, in which you as an expert will choose from a Likert-type scale from one to five, where one is the lowest recommended score for that performance indicator and five is the highest score. There will be a space for comments for you to give their rationale for their specific scores for the performance indicators as qualitative section

Thank you once again for participating in this study. If you have any questions about or difficulties with the survey, please contact us at [redacted] Phone: +966530800800,13124792152

PIs	Domain: Equity/Accessibility
	1-Access to Care
	a-Coverage
% of persons with health insurance or any other sort of healthcare coverage in the catchment area	Type: structure Description: Numerator: number of patients with insurance or payment coverage by any kind from the government and/or from private visiting the hospital. Denominator: number of all the patients visiting the hospital.
	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	Comment:
% of persons with any private insurance coverage in the catchment area	Type: structure Description: Numerator: number of patients with private insurance or payment coverage visiting the hospital. Denominator: number of all the patients visiting the hospital.
	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	Comment:
% of persons with only public insurance coverage or other type of governmental coverage visiting the hospital	Type: structure Description: Numerator: number of patients with insurance or payment coverage by any kind from the government visiting the hospital. Denominator: number of all the patients visiting the hospital.
	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	Comment:

Figure 4: Sample of Round-2 Survey:

Selection Performance Indicators for PPPs in Healthcare

Introduction

Thank you for participating in this research where we are identifying the performance indicators of public-private partnerships and privatization activities in health care projects in Saudi Arabia. In this exercise, we will use Delphi method to determine how the experts in health care system in Saudi system identify the performance indicators and prioritize them to measure the impacts of privatizing health care services in Saudi Arabia. In this study, the focus will be toward the performance indicators for privatization and public-private partnerships projects in secondary and tertiary care hospitals. This study is being conducted by a team include a doctorate students and research assistance from Johns Hopkins University, United States and University of Dammam , Saudi Arabia in collaboration with Saudi Central Board for Accreditation of Healthcare Institutions CBAHI.

By using Delphi exercise we anticipate to have an interactive and enlightening process between the expert participants. However, we understand dealing with a broad topic and domains related to performance indicators can be associated with a degree of uncertainty and debatable issues, so we would encourage that you supply the best estimate based on your experience. For this purpose, we have selected expert participants with variety of backgrounds so you shouldn't be concerned if you are comfortable to answer some questions more than others. All what we expect is to have you answer each question to the best of your ability. Also, we would like to remind you all the answers will be anonymously analyzed and entered.

One integral element to the Delphi Method is to provide explanations / justifications for your choices. These can be short (one or two brief bullet points) or long (a detailed explanation listing various causal variables), depending on your preference, but the comments should be sufficient to allow any reader to understand how you made your estimate and what assumptions were involved. We therefore ask that—unless otherwise stated—you supply at least some explanation for every comment field in the questionnaire.

The questionnaire will have a quantitative section, in which you as an expert will choose from a Likert-type scale from one to five, where one is the lowest recommended score for that performance indicator and five is the highest score. There will be a space for comments for you to give their rationale for their specific scores for the performance indicators as qualitative section.

Thank you once again for participating in this study. If you have any questions about or difficulties with the survey, please contact us at aalbuth1@jhu.edu Phone: +966530500500/+13124792152

Selection Performance Indicators for PPPs in Healthcare

Profile Information

* 1 Please enter your name:

* 2 Please enter your code from Round 1:

Prev Next

1- Clinical Care

Please rate the indicator from 1 to 5 where 1 being the lowest and 5 being the highest rating.

* 3 Indicator 1

Rating

Readmission rate within 30-days based on diagnosis difference

Score: 85.5

Type: process **Definition:** Readmission rate defines hospital readmission as un-planned patient admission to a hospital within 30 days after being discharged from an earlier hospital stay .Patients transferred to another hospital for longer term care won't count as a readmission
Numerator: Inpatient readmission for any cause within 30 days of a congestive heart failure admission. The 30-day window is defined from the end of the admission (discharge date) to the beginning of the first, subsequent admission (admission date). The readmission can occur at any hospital within the same region as the initial admission. Readmissions may be discharged in January to December, include a patient discharge status of "died," and be transferred. **Denominator:** Inpatient index admissions that occurred between January 1 and November 30 with a clear and specific diagnosis that did not die in the hospital.
Unit: The standard benchmark used by the Centers for Medicare & Medicaid Services (CMS) in United States and other international healthcare quality bodies is the 30-day readmission rate. Rates at the 80th percentile or lower are considered optimal. The readmission rate is equal to the numerator divided by the denominator, multiplied by 100. Rates are observed and not risk-adjusted for age, gender, or severity.

* 4 Indicator 2

Rating

Percentage of thromboembolism prophylaxis

Score:93.3

Type: process **Definition:** This measure is used to assess the percentage of adult hospitalized patients 18 years and older who have a venous thromboembolism risk assessment within 24 hours of admission.
Numerator: Number of adult patients hospitalized for a medical condition or surgery who are assessed for venous thromboembolism risk within 24 hours of admission to the hospital **Denominator:** Number of adult patients who are hospitalized for a medical condition or surgery

Quality

Clinical Care Module

Table 14. Clinical care module, Differences between rounds 1 and 2

Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %	Difference range
Q3: Percentage of thromboembolism prophylaxis	4.66	0.69	4.72	0.67	0.06	0.3	1.29	
Q10: Compliance rate for prophylaxis antibiotics prior to surgeries	4.44	1.04	4.5	1.04	0.06	0.3	1.35	
Q11: Percentage of CT scan of brain within 30 minutes of patients with TIA or Stroke	4.17	1.2	4.17	1.34	0	NA	0.00	-1 to 2
Q12: Percentage of ECG measured within 10 minutes of arrival	4.22	1.06	4.28	1.07	0.06	0.3	1.42	
Q23: Hysterectomy rate	4.22	1.06	4.28	1.01	0.06	0.8	1.42	
Q26: The pure rate of hospital mortality	4.44	1.04	4.39	1.29	-0.05	0.8	1.13	
Q32: Craniotomy	4	1.19	3.83	1.25	-0.17	0.08	4.25	

mortality rate								
Q33: Heart failure mortality rate	4.22	1.17	4.22	1.11	0	NA	0.00	-1 to 1
Q34: Acute stroke mortality rate	3.33	1.17	3.72	1.33	0.39	0.13	11.71	
Q35: Gastrointestinal mortality rate	4	1.24	3.72	1.45	-0.28	0.13	7.00	
Q36: Pneumonia mortality rate	4.22	1.17	4	1.24	-0.22	0.21	5.21	
Q37: Acute myocardial infarction mortality rate	3.94	1.21	4.16	1.15	0.22	0.21	5.58	
Q41: Postoperative respiratory failure rate	4.5	0.79	4.22	1.11	-0.28	0.13	6.22	
Q42: Perioperative pulmonary embolism or deep vein thrombosis rate	4.33	0.91	4.33	0.91	0	NA	0.00	-1 to 1
Q43: Postoperative sepsis rate	4.33	0.84	4.38	0.85	0.05	0.3	1.15	
Q44: Postoperative wound dehiscence rate	4	0.84	4.22	0.73	0.22	0.1	5.50	
Q45: Chronic obstructive	4	0.84	4.05	0.94	0.05	0.75	1.25	

pulmonary disease or asthma in older adults' admission rate								

Table 15. Patient Safety module, differences between rounds 1 and 2

Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %
Q4: Percentage of awareness of staff to patient culture safety	4.33	1.03	4.39	1.04	0.06	0.33	1.39
Q9: Blood transfusion reaction rate	4.83	0.09	4.89	0.08	0.06	0.33	1.24
Q11: Number of (DART) of steriliser machines	4.1	1.03	4.2	1	0.1	0.33	2.44
Q13: Hospital acquired infection rate based on ward	4.78	0.54	4.83	0.51	0.05	0.33	1.05
Q14: Hospital infection rate based on diagnosis	4.33	1.19	4.56	0.86	0.23	0.33	5.31
Q15: Hospital infection rate based on procedure	4.5	1.1	4.78	0.55	0.28	0.24	6.22

Q16: Hospital Acquired MRSA rate	4.67	0.2	4.89	0.11	0.22	0.21	4.71
Q23: Number of adverse drug reaction	4.56	0.62	4.67	0.59	0.11	0.16	2.41
Q26: Central venous catheter related blood stream infection rate	4.78	0.55	4.83	0.51	0.05	0.33	1.05
Q27: Birth trauma rate	4.5	0.62	4.61	0.61	0.11	0.16	2.44

Table 16. Patient care module, differences between rounds 1 and 2.

Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %
Q2: Percentage of patient satisfaction of rooms and clinic cleaning	4.44	0.78	4.5	0.79	0.06	0.33	1.35
Q3: Staff satisfaction percentage	4.67	0.49	4.72	0.46	0.05	0.33	1.07
Q4: In-Patient satisfaction percentage	4.55	0.62	4.6	0.61	0.05	0.33	1.10
Q5: Out-Patient satisfaction percentage	4.44	0.7	4.5	0.71	0.06	0.33	1.35
Q6: Legal compliant from hospital within one year	4.11	1.13	4.22	1.11	0.11	0.33	2.68

Table 17. Questions with perfect correlation between rounds

Quality Domains					
Clinical Care Module			Patient Safety		Patient Centred
Q1: Readmission rate within 30-days based on diagnosis difference	Q16: Abdominal Aortic Aneurysm repair volume	Q29: Pancreatic resection mortality rate	Q1: Percentage of prevention maintenance accomplished as per schedule	Q19: Number of sentinel events	Q1: Success in obtaining certificate and accreditations of management quality
Q2: Rate of Aspirin prescribed within 24 hours of arrival for all MI patients	Q17: Coronary artery bypass graft volume	Q30: Abdominal Aortic Aneurysm repair mortality rate	Q2: Percentage of nursing compliance on patient identification during medication preparation and administration	Q20: Inappropriate patient surgical site marking	
Q4: Percentage of discrepancies between pre- and postoperative diagnosis	Q18: Carotid endarterectomy volume	Q31: Coronary artery bypass graft (CABG) mortality rate	Q3: Percentage of compliance of handover utilisation process	Q21: Number of non-drugs related near miss	
Q5: Percentage of laboratory critical values reporting within 30 minutes	Q19: Laparoscopic cholecystectomy rate	Q38: Death rate among surgical inpatients with serious treatable conditions	Q5: Percentage of hand hygiene compliance	Q22: Number of drugs related near miss	
Q6: Percentage of caesarean	Q20: Incidental appendectomy	Q39: Iatrogenic	Q6: Percentage of falls rate per	Q24: Rate of Healthcare associated	

deliveries in nulliparous with a term singleton baby in vertex	in the elderly rate	pneumothorax rate	1000 patients' days	Staphylococcus Aureus bloodstream infections	
Q7: Caesarean delivery rate, uncomplicated	Q21: Bilateral cardiac catheterisation rate	Q40: Perioperative haemorrhage or hematoma rate	Q7: Blood culture contamination rate	Q25: Rate of Healthcare associated Clostridium Difficile infections	
Q8: Vaginal births after caesarean delivery rate, uncomplicated	Q22: Percutaneous coronary intervention rate	Q46: Asthma in younger adults' admission rate	Q8: Cross match transfusion rate		
Q9: Percentage of relievers of children inpatient asthma	Q24: Diabetes, short – term complications admission rate	Q47: Hypertension admission rate	Q10: Percentage of completed meal identification card for in-patients		
Q13: Percentage of radiology report turnaround time outliers	Q25: Diabetes, long-term complications admission rate	Q48: Heart failure admission rate	Q12: Rate of medical waste generation in the hospital		
Q14: Oesophageal resection volume	Q27: Number of deaths in low mortality diagnostic related groups	Q49: Low birth weight admission rate	Q17: Pressure ulcer incidence rate		
Q15: Pancreatic resection volume	Q28: Oesophageal resection mortality rate	Q50: Dehydration admission rate	Q18: Hospitals accidents prevalence rate		

Accessibility

Table 18. Barriers module, differences between rounds 1 and 2								
Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %	Difference Range
Q9: Average length of stay based on different diagnosis	4.66	0.6	4.66	0.6	0	NA	0.00	-1 to 1
Q11: Emergency department waiting times by triage category	4.56	0.78	4.61	0.78	0.05	0.33	1.10	
Q12: Percentage of emergency patients transferred to a ward within 4 hours by triage category	4.44	1.04	4.39	1.04	-0.05	0.33	-1.13	

Table 19. Ability of provider module, differences between rounds 1 and 2							
Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %
Q3: Does provider explain things	4	1.37	3.9	1.43	-0.1	0.33	2.5
Q4: Does provider show respect for what you had to say	4.05	1.35	4.11	1.32	0.06	0.33	1.5
Q5: Provider spend enough time with you	4.11	1.02	4.22	1	0.11	0.16	2.7
Q6: Satisfied with quality of care received from provider	3.94	1.47	4	1.5	0.06	0.33	1.5
Q7: Are they confident in provider's ability to help when they have a medical problem	3.83	1.5	3.89	1.53	0.06	0.33	1.6
Q8: Would have gotten better care if different race/ethnicity	2.44	1.46	2.5	1.54	0.06	0.33	2.5
Q12: Very easy to understand information from doctor's office	4.33	1.02	4.39	1.03	0.06	0.33	1.4

Table 20. Accessibility to care module, differences between rounds 1 and 2

Question	Mean1	SD	Mean2	SD	Absolute Difference	p-value	Relative Difference %
Q1: % of persons with health insurance or any other sort of healthcare coverage in the catchment area	4.564	0.7	4.61	0.69	0.046	0.33	1.0
Q6: % of persons who have a specific source of ongoing care in hospital in each service line	4.06	1.16	4.28	1.02	0.22	0.21	5.4
Q8: % of persons with hospital outpatient department as usual source of care	4.11	1.08	4.28	0.96	0.17	0.45	4.1
Q9: % of persons with hospital emergency department as usual	4.5	0.92	4.67	0.69	0.17	0.33	3.8

source of care							
Q10: % of patients that experience difficulties or delays in obtaining health care or do not receive needed care for himself, or one or more family members	4.11	1.32	4.22	1.11	0.11	0.33	2.7

Table 21. Questions with perfect correlation between rounds

Equity or Accessibility theme		
Barriers	Accessibility	Ability
Q1: % of persons who complaints about or asked for transportation to get to provider	Q2: % of persons with any private insurance coverage in the catchment area	Q1: Does provider generally listen
Q2: Does provider have office hours at night or on weekends?	Q3: % of persons with only public insurance coverage or other type of governmental coverage visiting the hospital	Q2: Does provider usually ask about prescription medications and treatments other doctors may give
Q3: How difficult is it to get appointment with provider on short notice?	Q4: % of persons uninsured all year in the catchment area	Q9: Felt treated with disrespect because of race/ethnicity
Q4: How difficult is it to contact provider over the telephone or emails about a health problem?	Q5: % of persons with any period of un-insurance during a year	Q10: Doctor understands background and values
Q5: How much of a problem was it to get a referral to a specialist that you need to see?	Q7: % of persons in fair or poor health who have a specific source of ongoing care	Q11: Very easy to understand prescription bottle
Q6: How satisfied with professional staff	Q11: Main problem that caused family member's difficulty,	Q13: Very easy to get medical reports

	delay, or not receiving needed health care	
Q7: Average inpatients waiting time for bed	Q12: % of patients in which a family member did not receive doctor's care or prescription medications because the family needed the money, not insured or delays from payers	Q14: Very easy to get tests and radiology results
Q8: Average outpatients waiting time for their appointment	Q13: Satisfied that your family can get health care if they need it	
Q10: Percentage of patients stayed in ER for more than 6 hours		
Q13: Average waiting time for elective surgery patient by urgency category		
Q14: Percentage of patients in ER left before seen (Disposition)		

Table 22-a`: Correlation Matrix for Clinical Care module, Rounds 1 and 2:

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Q1	1.00									
Q2	0.75	1.00								
Q3	0.56	0.51	0.94							
Q4	0.49	0.44	0.45	1.00						
Q5	0.27	0.25	0.60	0.12	1.00					
Q6	0.48	0.31	0.64	0.69	0.21	1.00				
Q7	0.71	0.40	0.36	0.48	0.04	0.44	1.00			
Q8	0.44	0.28	0.49	0.47	0.35	0.71	0.62	1.00		
Q9	0.01	0.18	0.12	0.04	0.12	0.12	-0.07	0.27	1.00	

Q10	0.25	0.51	0.36	0.41	0.45	0.32	0.09	0.12	0.02	0.97

	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20
Q11	0.90									
Q12	0.54	0.98								
Q13	-0.04	0.48	1.00							
Q14	0.05	0.43	0.67	1.00						
Q15	0.05	0.43	0.67	1.00	1.00					
Q16	-0.01	0.36	0.53	0.85	0.85	1.00				
Q17	0.10	0.47	0.69	0.97	0.97	0.86	1.00			
Q18	0.42	0.51	0.14	0.39	0.39	0.42	0.42	1.00		
Q19	0.34	0.27	-0.09	0.11	0.11	0.16	0.17	0.18	1.00	
Q20	0.06	0.37	0.10	0.36	0.36	0.56	0.44	0.33	0.54	1.00

	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30
Q21	1.00									
Q22	0.50	1.00								
Q23	0.22	0.33	0.48							
Q24	-0.11	0.02	0.21	1.00						
Q25	0.39	0.16	0.05	0.29	1.00					
Q26	-0.17	-0.25	0.01	0.59	0.44	0.74				
Q27	0.51	0.67	0.34	0.24	0.41	0.13	1.00			

Q28	0.49	0.68	0.35	0.33	0.40	0.10	0.99	1.00		
Q29	0.42	0.58	0.27	0.24	0.28	0.10	0.93	0.94	1.00	
Q30	0.48	0.69	0.31	0.39	0.37	-0.03	0.91	0.93	0.78	1.00

	q31	q32	q33	q34	q35	q36	q37	q38	q39	q40
Q31	1.00									
Q32	0.85	0.95								
Q33	0.88	0.84	0.96							
Q34	0.58	0.57	0.46	0.66						
Q35	0.94	0.84	0.85	0.52	0.85					
Q36	0.88	0.79	0.91	0.65	0.63	0.82				
Q37	0.75	0.65	0.66	0.61	0.76	0.71	0.81			
Q38	0.51	0.62	0.38	0.27	0.50	0.64	0.23	1.00		
Q39	0.45	0.41	0.44	0.17	0.05	0.18	0.27	0.07	1.00	
Q40	0.67	0.53	0.58	0.33	0.81	0.63	0.56	0.08	0.19	1.00

	q41	q42	q43	q44	q45	q46	q47	q48	q49	q50
Q41	0.74									
Q42	0.21	0.93								
Q43	0.42	0.62	0.96							
Q44	0.25	0.00	0.33	0.77						

Q45	0.44	0.15	0.16	0.48	0.67					
Q46	-0.21	0.23	0.34	0.55	0.66	1.00				
Q47	0.25	0.25	0.41	0.45	0.44	0.68	1.00			
Q48	0.23	0.43	0.41	0.42	0.46	0.61	0.89	1.00		
Q49	0.21	0.33	0.50	0.45	0.46	0.72	0.65	0.50	1.00	
Q50	-0.09	0.12	0.21	0.22	0.22	0.70	0.66	0.50	0.75	1.00

Table 22-b: Correlation matrix patient centred module, Rounds 1 and 2

	q1	q2	q3	q4	q5	q6
Q1	1.00					
Q2	0.04	0.95				
Q3	0.06	0.46	0.88			
Q4	0.02	0.00	0.58	0.93		
Q5	0.43	0.21	0.22	0.56	0.94	
Q6	0.06	-0.33	0.06	0.24	-0.07	0.91

Table 22-c: Correlation matrix patient safety module, Rounds 1 and 2

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Q1	1.00									
Q2	0.27	1.00								

Q3	-0.05	0.49	1.00							
Q4	0.32	0.09	0.44	0.97						
Q5	-0.17	0.43	0.35	-0.05	1.00					
Q6	0.14	0.18	0.08	0.09	0.35	1.00				
Q7	-0.02	0.39	0.83	0.25	0.36	0.04	1.00			
Q8	0.24	0.14	0.55	0.11	-0.17	0.04	0.63	1.00		
Q9	-0.13	-0.03	0.00	0.17	0.37	0.54	0.21	-0.04	0.79	
Q10	-0.13	0.27	0.70	0.30	0.15	-0.04	0.79	0.53	-0.06	1.00

	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20
Q11	0.89									
Q12	0.16	1.00								
Q13	0.42	0.37	0.90							
Q14	0.53	0.39	0.48	0.62						
Q15	0.21	0.38	0.26	0.19	0.49					
Q16	0.58	0.27	0.82	0.85	0.34	0.50				
Q17	0.08	0.27	0.78	0.49	0.90	0.89	1.00			
Q18	0.04	0.47	-0.05	-0.18	-0.14	-0.04	-0.13	1.00		
Q19	0.26	0.07	0.59	0.24	0.52	0.69	0.59	0.07	1.00	
Q20	-0.18	0.80	0.29	0.16	0.33	0.37	0.40	0.32	0.19	1.00

	q21	q22	q23	q24	q25	q26	q27
Q21	1.00						
Q22	0.86	1.00					
Q23	0.53	0.45	0.86				
Q24	0.35	0.18	0.39	1.00			
Q25	0.24	0.19	0.45	0.83	1.00		
Q26	0.26	0.05	0.48	0.42	0.36	0.90	
Q27	0.00	-0.13	0.16	0.11	0.13	0.65	0.86

Table 22-d: Correlation matrix Ability of provider module, Rounds 1 and 2

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Q1	1.00									
Q2	0.70	1.00								
Q3	0.67	0.49	0.99							
Q4	0.82	0.60	0.82	0.98						
Q5	0.78	0.66	0.57	0.69	0.95					
Q6	0.53	0.40	0.47	0.52	0.57	0.99				
Q7	0.63	0.39	0.68	0.81	0.65	0.52	0.99			
Q8	-0.03	0.20	0.35	0.22	0.17	0.19	0.29	0.99		
Q9	0.20	0.33	0.52	0.36	0.34	0.40	0.53	0.75	1.00	
Q10	0.45	0.64	0.72	0.62	0.59	0.65	0.51	0.48	0.69	1.00

	q11	q12	q13	q14
Q11	1.00			
Q12	0.78	0.97		
Q13	0.82	0.84	1.00	
Q14	0.82	0.84	1.00	1.00

Table 22-e: Correlation matrix Barriers module, Rounds 1 and 2

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Q1	1.00									
Q2	0.80	1.00								
Q3	0.48	0.39	1.00							
Q4	0.34	0.18	0.77	1.00						
Q5	0.00	-0.14	0.46	0.68	1.00					
Q6	0.52	0.25	0.59	0.73	0.53	1.00				
Q7	-0.20	-0.36	0.10	0.33	0.59	0.36	1.00			
Q8	0.06	-0.21	0.23	0.10	0.23	0.21	0.44	1.00		
Q9	-0.04	-0.31	0.12	0.22	0.00	0.18	0.09	0.40	0.83	
Q10	0.01	-0.24	-0.01	-0.03	-0.19	0.21	0.03	0.28	0.48	1.00

	q11	q12	q13	q14
Q11	0.95			
Q12	0.88	0.97		

Q13	0.39	0.46	1.00	
Q14	0.45	0.12	0.40	1.00

Table 22-f: Correlation matrix Accessibility module, Rounds 1 and 2

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Q1	0.94									
Q2	0.36	1.00								
Q3	0.18	0.21	1.00							
Q4	0.11	0.61	0.08	1.00						
Q5	0.23	0.20	0.27	0.45	1.00					
Q6	0.61	0.22	0.16	0.08	0.32	0.78				
Q7	0.53	0.26	0.37	0.10	0.36	0.68	1.00			
Q8	0.22	0.76	0.10	0.45	0.24	0.02	0.32	0.59		
Q9	0.32	0.23	-0.07	0.16	0.11	-0.09	0.24	0.10	0.65	
Q10	0.21	0.31	-0.11	0.13	-0.19	-0.03	0.22	0.13	0.13	0.91

	q11	q12	q13
Q11	1.00		
Q12	0.55	1.00	
Q13	0.24	0.46	1.00

Table 23-Descriptions of the selected indicators

PIs	Domain: Effectiveness/Quality
	1-Clinical Care
Percentage of thromboembolism prophylaxis	Type: process Description: "This measure assesses the number of patients who received VTE prophylaxis or have documentation why no VTE prophylaxis was given the day of or the day after hospital admission or surgery end date for surgeries that start the day of or the day after hospital admission"
Percentage of laboratory critical values reporting within 30 minutes	Type: process Description: "The measurement is to find the percentage of total of documented critical values notified within 30 minutes compared to the total number of critical value reports and released"
	2-Patient Safety
Percentage of nursing compliance on patient identification during medication preparation and administration	Type: structure Description: This indicator measures the percentage of nurses' compliance with identification protocol compared to total medication delivery by nurses
Percentage of hand hygiene compliance	Type: process Description: This performance indicator to identify the percentage of total number of observed opportunities when hand hygiene was indicated and performed successfully compared to total number of hand hygiene indicated
Percentage of falls rate per 1000 patients days	Type: process Description: "All unassisted and assisted falls are to be included whether they result from physiological reasons (fainting) or environmental reasons (slippery floor) which is calculated as rate per 1000 patients' days"
Blood transfusion reaction rate	Type: process Description: It compares the number of incidences related to blood transfusion reaction to the total number of blood transfusion times
Hospital acquired infection rate based on ward	Type: outcome Description: Rate of HAIs based on ward
Hospital infection rate based on procedure	Type: outcome Description: Rate of HAIs related to procedures
Hospital Acquired MRSA rate	Type: outcome Description: Number of MRSA infection after admission compared to total admissions
Pressure ulcer incidence rate	Type: outcome Description: Number of patients developed pressure ulcers after admission compared to the total admissions
Number of sentinel events	Type: outcome Description: "an unexpected occurrence involving death or serious physiological or psychological injury, or the risk thereof"
Inappropriate patient surgical	Type: outcome

site marking	Description: Percentage of patients with inappropriate surgical site marking compared to the total number of surgeries
Number of adverse drug reaction	Type: outcome Description: An adverse drug event (ADE) or reaction involves harms to patients caused by medication use
Central venous catheter related blood stream infection rate	Type: outcome Description: "Central venous catheter-related bloodstream infections (secondary diagnosis) per 1,000 medical and surgical discharges for patients ages 18 years and older or obstetric cases. Excludes cases with a principal diagnosis of a central venous catheter-related bloodstream infection, cases with a secondary diagnosis of a central venous catheter-related bloodstream infection present on admission, cases with stays less than 2 days, cases with an immunocompromised state, and cases with cancer"
Birth trauma rate	Type: outcome Description: "Birth trauma injuries per 1,000 newborns. Excludes preterm infants with a birth weight less than 2,000 grams, and cases with osteogenesis imperfecta."
	3-Patient-Centered and Coordinated Care
Staff satisfaction percentage	Type: process Description: Percentage of staff satisfied with employer compared to the total number of employees
In-Patient satisfaction percentage	Type: process Description: Percentage of in-patients satisfied with services compared to the total number of patients

PIs	Domain: Equity/Accessibility
	1-Access to Care
	a-Coverage
% of persons with health insurance or any other sort of healthcare coverage in the catchment area	Type: structure Description:" Numerator: number of patients with insurance or payment coverage by any kind from the government and/or from private visiting the hospital. Denominator: number of all the patients visiting the hospital."
	b-Usual Source
% of persons with hospital emergency department as usual source of care	Type: process Description: :"Numerator: Number of patients who visited the emergency department for a first time, follow-up, or treatments. Denominator: Number of all the patient visiting the hospital during the year."
	2-Barriers within the system
	c-Waiting Time
Average	Type: process

outpatients waiting time for their appointment	Description: “Waiting time from requesting the appointment until the date of getting the date of the appointment.”
Average length of stay based on different diagnosis	Type: process Description: “Length of stay from the date and time of admission until discharge based on diagnosis.”
Emergency department waiting times by triage category	Type: process Description: “Average waiting time from the patient registration based on triage category”
Percentage of patients in ER left before seen (Disposition)	Type: process Description: “Numerator: number of patients registered in the ER and have not been seen by provider. Denominator: total number of patients visiting the ER department.”

Biography:

Abdullah Albuthi is a medical doctor and entrepreneur experienced in healthcare business development and oversight, desires to foster healthcare efficacy, safety and quality in public and private institutions.

Abdullah is a Founder, Specialist Consultants and Board Member of numerous business organizations operating out of Saudi Arabia, UAE and the United States in healthcare, education, CSR services and investments.

In addition, he earned a Doctorate Degree within the Health Care Leadership and Management program at John Hopkins University in Maryland, USA focusing on health care management and PPPs.